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DOES THE BANKS CAPITAL STRUCTURE AFFECT BANK PERFORMANCE? NORDIC EVIDENCE

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ABSTRACT

Banking activities are considered to be important in the economy. The main purpose of banks is to ensure that the financial economy is stable. Banking activities are heavily regulated and supervised and especially capital structure is under surveillance. Regulators assume that capital structure of banks has an impact on banking activities.

This study examines, whether banks' capital structure affect banks performance. There are many studies about capital structure and the results of the studies vary depending on the author. While researching banks capital structure, it is meaningful to discuss about regulations of banking. Regulations are usually based on known risks in banking activities.

Banks, as well as other corporations, performance is measured by different performance ratios. Most of the performance ratios are based on the corporations profits. Banks performance and amount of capital become important when banking activities are struggling. These sorts of situations occur when banks experience crisis.

This study examines how banks capital structure impact on banks performance in three different time periods. The impact of capital structure is examined before the financial crisis 2007-2008, during the financial crisis 2007-2008 and after the financial crisis. The results suggest that capital structure impacts on banks performance during all time periods of this study. Banks that are included in this study operate on Nordic area.

KEYWORDS: capital structure, banking, performance, banking regulations

1. INTRODUCTION

Banking activities have been under the surveillance for the past years. Banking activities are examined from various different sources. The regulation and supervision of banks is getting more attention. Banks operate as the intermediary between investors and borrowers and have additional important tasks in financial markets. One of the tasks of the banks is to supply the contracts and allocate the risks (Elomaa, Puttonen & Siikala 1996: 13.)

The research of banks capital structure is important because of the domino effect on banks. If one bank fails the others tend to fail also and even the whole economies can suffer from the failures in the banking sector. By regulating the capital structure supervisors can try to prevent the possibility of credit risks and decrease the possibility of insolvencies of the banks. When the financial crisis hit on 2008 the regulators begun to review the banking activities. After the crash of Lehman Brothers and the financial crisis followed by that, the regulators begun to consider new regulations, which will protect the banking activities in the future. Financial crisis of 2007-2008 is a good reminder, that the collapse of one bank can lead to collapses in the other banks and possible mergers and acquisitions.

This topic is relevant and also interesting on the light of the past and current financial situation. It is crucial to aim securing the banking activities and prevent the possible crisis in the future. The capital structure of banks as well as the banks performance is under the surveillance at this moment. Banking activities draw more attention than they did before, since banking is a huge part of the whole financial markets.

1.1. Background and motivation

Banking activities have been under the surveillance for a long time period all over the world. In the past, central banks were operating through the government and the governments set the laws and regulations for the central banks. Central banks were also the banks of the banks as their tasks were tied to economical stability and countries monetary actions (Elomaa 1996: 160.) Banks have always impacted on the financial markets. However, the regulations on banking have been simplified, but it has developed multiple different crisis. For example, in the 1990s the Bank of Finland had to rescue the SKOP bank (Kjellman 1994: 15.) The largest world wide financial

crisis in the near history is the crisis of 2007-2008. The crisis drove Lehman Brothers to bankruptcy, which led to crisis in other banks. Some banks have survived from difficult time periods, while others suffer from enormous losses.

The motivation of this study is to research, what kind of impact does the capital structure have on banks' performance. The study of Berger and Bouwman (2013) suggest that there are both positive and negative impacts depending on performance variable, although the study of Demiguc-Kunt and Huizinga (2000) suggests that there is no impact. The impact in different among variables. The main purpose of this study is to find out whether the capital structure of the Nordic banks affect on Nordic banks performance in the financial crisis 2007-2008 and after the crisis period. This study includes banks from Denmark, Finland, Norway and Sweden. Iceland is excluded from this study, since its banking crisis in 2008 might have an impact on the results of this study. During the banking crisis in Iceland three of the biggest banks of Iceland collapsed.

Most of the studies on banks capital structure and performance are done with U.S. or EU data. This study is unique since it studies only Nordic countries. Nordic countries are small and their banking industry is integrated, which makes it interesting to research the impact on only these countries. In addition, this study uses data from 2005-2014, so the data is quite new. Previous studies of Berger and Bouwman (2013) and Demiguc-Kunt and Huizinga (2000) use data from 1980's to 2010.

1.2. Previous main studies

Many studies of this subject suggest that capital structure affects on banks performance and market value. However, the theories of the optimal capital structure propose that the capital structure does not matter. Modigliani and Miller were the first researchers, who investigated the capital structure of the corporations. They suggest that the capital structure has no impact on corporates market value (Modigliani & Miller 1958.)

The tradeoff theory suggests that market or regulatory forces are suspected to drive insurers to hold adequate amount of capital to maintain tolerable insolvency risk. According to this theory the companies hold as much debt as they can in order to maintain the optimal insolvency risk. The pecking order theory suggests that informational asymmetries between companies and investors imply that external

capital is more expensive than internal capital. So companies prefer to use internal capital first and if that is not enough, then they rely on external capital (Cheng, Weiss 2012: 4-6.)

Unlike other studies, the study of Demiguc-Kunt and Huizinga (2000) researched banks financial structures impact on bank performance over 1990-1997. Their study suggests that there is not impact between these two variables. The study of Demirguc-Kunt and Huizinga (2010) suggest that there is a positive relation between bank equity and profitability and Berger and Bouwman (2013) show that bank equity improves the performance of medium and large banks especially during banking crises. The study of Berger and Bouwman includes banks from U.S. and banking crises that occurred between 1984 and 2010. The study of Beltratti and Palandino (2015) researches bank leverage and profitability. The study focuses on optimal leverage ratio over time and is done with banks of large countries for example Australia, US and Germany.

The main studies discuss the capital structure in many different ways and of the optimal capital structure varies among the researchers. However, in the banking industry, studies show that the capital structure matters and that higher amount of equity capital usually results better performance.

1.3. Research problem

The purpose of this study is to find out, what kind of impact does the capital structure have on banks' performance. Previous studies show that there is a positive relationship between bank equity and profitability. This research is done to find out does the capital structure of the Nordic banks affect on Nordic banks performance in the financial crisis 2007-2008 and after the crisis period. Banking activities are supervised and banks performance is observed regularly by different sources. Are regulations and legal activities meaningful, if the bank capital structure does not matter on their profitability and performance? This thesis is limited to research the capital structure and performance as well as these factors functioning together. The thesis has three hypothesis's:

H1: Banks' capital structure before the financial crisis of 2007-2008 impacts on banks performance during the crisis period.

H2: Banks' capital structure during the financial crisis of 2007-2008 impacts on banks performance after the crisis period

H3: Banks' capital structure affect bank performance over time

The first hypothesis is similar to the study of Berger and Bouwman (2013). Their study researched how does the capital structure before the financial crisis impact on bank performance during the crisis periods. Hypothesis two expands the study of Berger and Bouwman (2013) by adding after crisis period to the study. It is expected that financial crisis decrease the values of capital structure variables and therefore it is interesting to see how two years of low values affect banks ability to survive from the financial crisis. Hypothesis three is similar to the study of Demiguc-Kunt and Huizinga (2000). The crisis period in this study is the same that is used in the study of Fahlenbrach, Rüdiger and Stulz (2011). The performance of the banks is measured by various ratios and profitability calculations.

1.4. Structure of the thesis

This thesis overviews the capital structure of banks. Chapter two reviews capital structure theories and studies. After this the thesis observes the forming of banks return. Banks capital structure is influenced by the regulations and standards. The standards, which are reviewed in this study are Basel I, Basel II and Basel III. Chapter two will also cover the risks in banking sector.

In chapter three banks performance will be added to the study. At first the measures of banks performance and profitability will be presented. After this the performance is viewed before, during and after the financial crisis 2007-2008.

The data and research methodologies are represented after the theory part of the thesis in chapter four. Chapter four includes the summary statistics and the main study. The results are presented in chapter four as text and tables. As the data this paper uses Bankscope. Data is collected from years 2005-2014. Chapter 5 concludes this study.

2. BANKS' CAPITAL STRUCTURE AND BANKING

Banks have an important role in supplying finances in financial markets. Banks supply finances between surplus and deficit economies among with the other organizations that operate in financial markets (Elomaa 1996: 13.) Because of this, banks have strict regulations of the capital structure. Banks are supervised by many institutions. For example, the Financial Supervisory Authority supervises whether banks follow given regulations or not. Banks differ from other corporations in the markets. They have a chance to use government secured loans and they also have lower bankruptcy costs than regular companies (Harding, Lian & Ross 2012.) Banks' capital is divided to equity and liabilities.

Since banks' role is to supply finances between market participants there is a chance of a principal-agent problem. Customers might not be aware of banks' financial situation and if the bank collapses, investors might end up loosing all of their investments. Banks are also a huge part of the economy, so collapse in one bank might lead to collapses in another banks and eventually spread through to the whole economy. Usually government tries to save banks from collapse, since the effect of the collapse to the whole economy is enormous. Moral hazard problem is well recognized in banking regulations and supervision. Because of the moral hazard problem, there are strict regulations on capital structure (Ross 1973.)

2.1. Theories of optimal capital structure

Modigliani and Miller (1958) are the first researchers who examine the capital structure of the company. In the year 1958 they created a theorem that suggests that speculating with the capital structure does not add company value. Company value is independent from company's capital structure. In theory, the value of the company is based on the power of earnings and assets. However, the value of the company is independent from the financial source of investments and dividend policy. The study assumes that the economy is under perfect competition. In perfect competition there are no taxes, transaction costs, bankruptcy costs, differences between loan rates, and information asymmetry. In perfectly competitive markets the leverage level of the company does not impact in its' earnings before interest and taxes (Modigliani & Miller 1958.)

In Modigliani, Miller theorem there are no taxes or bankruptcy costs. In this case the weighted average capital cost (WACC) should be constant even if the capital structure of the company changes. Capital structure should not affect company's stock price, since there are no advantages or changes, if the company raises its leverage ratio. Because of this, capital structure is not a significant factor on company market value (Modigliani 1958.)

(1) $WACC = \left(\frac{equity}{assets}\right) * (cost\ of\ equity) + \left(\frac{debt}{assets}\right) * (cost\ of\ debt) * (1 - Tc)$

(Kinnunen, Laitinen, Laitinen, Leppiniemi, Puttonen 2010.)

The second theorem of Modigliani and Miller adds taxes to the model. New theory assumes that using leverage is useful until the optimal capital structure is reached. Theory takes the benefits of taxes in interest payments into consideration, since cuts on interests are tax-free. Especially bond issuance lowers tax responsibilities significantly. Dividend payments do not lower the tax responsibilities of the company. The real cost of interest in bond issuances is lower than nominal interest rate because of the advantages on tax cuts. According to the new theory, higher leverage ratio is better to company, because of the tax cuts (Modigliani 1963.)

The first theory of Modigliani and Miller suggests that the capital structure does not have an impact on company's market value. The second theory suggests that the higher leverage ratio is better choice, if company wants to increase its market value. High leverage ratio is still effecting on company's chance to get more debt.

Tradeoff theory states that market or regulatory forces are assumed to drive corporations to hold enough capital to maintain an acceptable insolvency risk. Corporations' job is to balance between the benefits against holding capital and reach the optimal insolvency risk. Corporations with lower insolvency risk are assumed to make more profit, than corporations with higher insolvency risk. Low insolvency risk indicates that the corporation is more stable and because of that it is considered to be "safe". Safe corporations can add safety premium to their prices (Cummins and Danzon, 1997). However, holding capital is costly to corporation. Corporations' capital structure is not always optimal because of the high costs of equity and companies tradeoff between capital and insolvency risk (Cheng and Weiss 2012).

Pecking order theory assumes, that informational asymmetries between equity providers and firm managers leads to that external capital is most likely more costly

than internal capital (Myers, 1984; Froot, Scharfstein, and Stein, 1993.) Therefore firms tend to use internal capital first while doing financial investments. If a firm is required to use external capital its' next choice will be safe debt. Issuing equity is the last choice of a firm, because of the high cost (Myers & Majluf, 1984.) This theory does not give an answer to optimal capital structure, since firms prefer to acquire financial slack for future investments. Current capital levels are directly related to the net changes in the firm's internal and external cash flows (Cheng 2012.)

2.1.1. Previous literature

Hovakimian, Opler and Titman (2001) study the choice between equity and debt. They assume that corporations set their capital structure to the level, where the corporations can move towards to their target leverage-level. The theory of Hovakimian et al. (2001) is based on the assumption, that corporations have obstacles on moving towards to the targeted leverage-level. Target-level might change when the profitability of the corporation and the price of the corporations' share change. Based on the research, Hovakimian et al show that the past returns are important. With the past returns, corporations can observe leverage-ratios. Study shows that corporations show interest on moving towards targeted leverage-ratios, when they have to choose between the repurchase of equity and paying back the debt (Hovakimian, Opler and Titman 2001.)

Faulkender and Petersen (2006) discuss whether the source of capital affects on capital structure or not. The research shows that firms that have access to the public bond markets are significantly more leveraged than other firms. Source of firms' debt and possible access to bond markets influences strongly to firm capital structure. The firms that have access to public bond market are more likely to meet regulatory requirements, since their financial information is easily accessible. The firms with access to bond markets are however making their decisions on bond issuances based on capital markets (Faulkender and Petersen 2006.)

Firms' management can affect the capital structure of the firm. Berger, Ofek and Yermack (1997) research the stabile managements' impact on firms' capital structure. Their research proposes that a long-term CEO usually avoids making a new debt. Research shows that the leverage ratio is lower, if the CEO does not have any pressure of owning company and if the CEO does not have several different incentives. Leverage ratio is also lower when the CEOs' actions are not actively supervised. The

analysis of the change in leverage ratio shows that the amount of leverage rises when traditions are changed and the changes are threat to management. Traditions can be changed by failures in business, replacement of the CEO or the change in the largest shareholders (Berger, Ofeck and Yermack 1997.)

DeAngelo and Stulz suggest that banks should have as much debt as they could. Banks' purpose is to provide safe debt. Because of this banks have a major social role in society. Banks' debt is assumed to be safe, because banks' strategy is to create liquidity. Liquidity creation is based on a risk management. Banks manage their risks by hedging against the losses. The study assumes that there is no taxes, agency problems or the risk of moral hazard problems. Researchers agree that the model of extremely high leverage is not reliable in real world conditions. Theoretically banks should have as much debt as the can get (DeAngelo and Stulz 2015.)

Konziol and Lawrence (2009) study the risks of the banks and banks optimal capital structure. Researchers suggest that the evaluation of banks' risks should be considered on banks regulations. Banks try to optimize their capital structure by changing the volume of deposits in a long run (Konziol and Lawrenz 2009.) In reality banks do not hold minimum requirements of capital, but they do have voluntary capital buffers (Lindquist 2004.)

Banks change the amount of deposits voluntarily, because acting like this, banks can control their own leverage ratio and prevent breaking regulators rules. Banks raise the amount of deposits when they want to benefit from valuable investments. Because of the arrangement costs, banks do not change the amount of deposits frequently (Konziol 2009.)

However, significant number of banks have a target level of capital ratio. The study of Memmel and Raupach (2010) suggests that banks with a target capital ratio compensate with lower target ratios of another rates. Banks' capital ratios are significantly lower than regular non-financial firms'. Supervisory authorities and rating agencies force banks to control a minimum capital ratio. Lowest regulatory limit for the total-capital ratio in for example Germany is eight percent, rating agencies, however, want banks to hold a certain ratio of Tier 1 capital. The amount of Tier 1 capital is effecting on rating. Study implies, that there is a certain capital ratio that management reaches (Memmel and Raupach 2010.)

Harding, Lian and Ross (2012) research the optimal capital structure of banks. According to their study, banks that are heavily regulated tend to keep their capital level above the minimum requirements voluntarily. Their findings suggest that there is an optimal minimum capital ratio (Harding, Lian and Ross 2012.)

Capital structure studies suggest various different solutions for optimal capital structure. In some studies the maximum leverage is optimal or the structure does not matter at all. On the other hand, large amount of leverage arises the risk of insolvency. Equity and debt have different costs and the choice between them might not be easy. In theory, banks should choose the balance of holding safe capital, in other words, equity and risky assets. Source of capital seems to affect banks' willingness to follow the regulations. Banks with access to public bond markets are usually following the restrictions carefully. Banks are usually going towards their target level of debt and equity, while still counting possible outcomes and possibilities of loss. Management and stock prices seem to have an impact on banks decision on capital structure. Usually banks prefer to have a buffer against possible losses and they choose to hold equity above the minimum requirements voluntarily.

2.2. Forming of the bank return

Banks create their wealth from deposits. The major income of banks comes from debt issuance to the public (Elomaa 1996:15.) Banks collect interest rates from the debt they have issued. Interest rates are usually tied to interest rate indices, for example to euribor. Euribor-rates are calculated daily with the quotations of highly rated large banks in European region (Pohjola 2010:103.) Banks add premium on top of the interest rate, which is called a prime-interest rate. Prime-interest rate is banks self defined reference rate on the debt they issue. Some of the banks activities come from outside the balance sheet. These sorts of activities are usually securities and contracts, which involve financial organizing (Elomaa 1996: 16.)

Table 1. Simplified commercial bank balance sheet (Casu, Giranrdrone & Molyneux 2006: 197.)

Assets	**Liabilities**
Cash	Deposits: retail
Liquid assets	Deposits: wholesale
Loans	
Other investments	Equity
Fixed assets	Other capital terms
Total assets	**Total liabilities and equity**

Banks profitability can be led from banks' income statement. Banks', as well as other firms, profit is the difference between income and costs.

Table 2. A simplified bank income statement (Casu 2006: 206.)

A	Interest income
B	Interest expenses
C= (A-B)	Net interest income (or spread)
D	Provision for loan losses (PPL)
E= (C-D)	Net interest income after PPL
F	Non-interest income
G	Non-interest expense
H= (F-G)	Net non-interest income
I= (E+H)	Pre-tax net operating profit
L	Securities gains (losses)
M=(I+-L)	Profits before taxes
N	Taxes
O	Extraordinary items
P= (M-N-O)	Net profit
Q	Cash dividends
R= (P-Q)	Retained profit

Banks profits can be divided in interest profits and bank security provisions, profits from changes of values in income statement, profits from customer service and profits from sales and purchases. Profits are channeled to main functions of banking activities. The main functions are banking for customers, money and capital market actions and banks' investments and holdings. Banks' profitability and returns can be monitored as whole or through the service networks. This requires targeting customers' contracts to the service network and balancing expenses on inner charges and refunds (Elomaa 1996:34.)

2.3. Banking sector in Nordic countries

Nordic capital markets are a part of international capital markets. However, Nordic banking sector is slightly different from European banking sectors, since the major of foreign bank subsidiaries comes from other Nordic country. Nordic capital markets are significantly similar to European ones, but there are special characteristics in each country. Because Nordic banks have customers all over the Nordic area, the banking sector in all countries is integrated. Nordea and Danske Bank have the widest customer base in all Nordic countries. Denmark, Finland, Norway and Sweden have couple of the biggest banks that dominate the banking industry in each country. Even though there is a huge amount of banks in each country, the market is dominated by the largest banks (Finanssialan Keskusliitto 2009.)

All of the Nordic countries have different currencies. Finland is the only one using Euros. Regulations from European Central Bank are only affecting the Finnish banking system, however, the regulations are similar in each country. Norway is differing from other Nordic countries. It is the only country, excluding Iceland, which is not a part of European Union. Norway still has a similar regulation system as all the other Nordic countries.

2.4. National and international regulations on banking

There have always been rules and regulations on banking. Banking activities are limited by laws and settlements. For example in Finland monetary markets have been strictly regulated until the end of the 1980s'. The Central bank of Finland controlled the interest rates and foreign exchange rates and also exercised strict monetary policy

(Elomaa 1996.) Nowadays, the regulations of banking activities come also from European Central Bank and from the Bank of International Settlements. All of the Nordic banks follow Basel accords.

2.4.1. Denmark and FSA

The main task of the Danish FSA (Finanstilsynet) is the supervision of financial enterprises such as banks, mortgage-credit institutions, pension- and insurance agencies. The most important task of FSA is to monitor that the enterprises have acceptable amount of equity funds to cover their risks. The FSA also supervises the securities markets. The Danish FSA assists in forming financial legislation and issues managerial orders for the financial area. FSA is responsible for collecting and distributing statistics and key figures for the financial sector. FSA follows international standards issued by the Basel-Committee (Finanstilsynet 2015.)

2.4.2. Finland and Financial Supervisory Authority

Financial Supervisory Authority of Finland, later FSA-FIN co-operates with the Bank of Finland. Regulations for the Bank of Finland are pointed out by the ministry of finance. The tasks of FSA-FIN are supervision of financial enterprises, promote acceptable procedures and increase the knowledge about financial markets. FSA-FIN also gives licenses for enterprises, which operate in the financial markets and supervises the licensed enterprises. All of the financial enterprises are obligated to provide all necessary materials for FSA-FIN, so it can supervise and regulate for example banking activities. FSA-FIN is entitled to all financial and risk-management information of financial institutions. FSA-FIN co-operates with foreign EEA-supervisory authorities and follows the instructions of European Parliament (Laki Finanssivalvonnasta 19.12.2008/878.)

2.4.3. Sweden and Finansinspektionen

Finansinspektionen, later FI, supervises and analyses trends in the financial markets. FI estimates the financial state of individual companies, the various sectors and the financial market. FI examines the risks and regulations in financial companies and supervises compliances with acts, laws and other regulations. Companies that offer financial services require a license from the FI. The main task of FI is to issue regulations and general guidelines and evaluate existing legislation. FI supervises

compliances with Swedish Insider Act that investigates cases of financial manipulation. FI ensures that companies provide clear and complete information to their customers. FI prepares rules for financial reporting by financial companies (Finansinspektionen 2015.)

2.4.4. Norway and Finanstilsynet

Finanstilsynet, later FI-NO, is an independent government agency that builds on laws and decisions that come forth from the Parliament, The Government and the Ministry of Finance. International standards for financial supervision and regulation come via FI-NO. Because of the supervisory role, FI-NO aims to promote financial stability and orderly market conditions and to implant confidence that financial contracts will be followed and services are completed as intended. FI-NO deals with problems that may arise in financial institutes. FI-NO determines that Norwegian companies must allow competitive conditions with other EEA member countries. FI-NO is responsible for the supervision of banks in Norway (Finantilsynet 2015.)

2.4.5. Regulations from European Union

European Central Bank, later EBC, operates as a central bank of EU nations central banks. The activities and tasks of EBC are described in the operation contract of EU. The basic tasks of EBC are to define and implement EUs' monetary policy, carry the currency market, control the funds and contribute flawless payment system. EBCs' main task is to control and keep the financial system stable (European Central Bank 2015.)

Financial system needs to be stable in order to European economies to be stable. There are many risks in the financial system. ECB tries to find out and be aware of the possible risks. Especially financial crisis on year 2008, has shaken the credibility of the financial system. The general risk in banking is credit loss risk that arises especially in bad economic states. If banks focus on financing certain industries there is a risk that banks suffer credit losses if the industry has difficulties. Banks might also invest their equity on stock or bond markets and thus be exposed to drops on market prices (European Central Bank 2015.)

Financial institutes are in charge of protecting themselves against financial crisis. They should manage their capability to operate and manage their solvency. Risk

management is a vital way to protect institutions from financial crises. Authorities have their own ways to prevent crises'. They create regulations and rules for financial institutions. Authorities are obligated to follow and evaluate financial institutions and thus control weaknesses and threads of financial institutions (European Central Bank 2015.)

2.5. Bank of International Settlements and Basel Committee

The main purpose of the Bank of International Settlements, later BIS, is to serve central banks on monetary actions and financial stability on international level. BIS is the bank for central banks. BIS carry out its' task by enabling communication and by easing co-operation with the central banks. BIS supports communication with supervisor authorities and offers leading researches of communication methods between central banks and financial supervisory authorities. BIS works as major party for central banks with their financial transactions and offers to be reliable agent on international financial operations (BIS 2015.)

Basel Committee operates on Bank of International Settlements. Basel Committee is a worldwide adjuster for banking regulations and it offers co-operation on the matters of bank supervisory. Basel Committee has adjusted basic standards three times. These are Basel I, Basel II and Basel III.

2.5.1. Basel I

Basel I is adjusted on year 1988 and it mainly focused on credit risk by dividing banks' capital on four different risk categories. Basel I divides capital in two categories. Tier 1 capital consists of cash reserves and stock and share capital. Tier 2 capital consists of credit losses, subordinated loans and hybrid loans. According to Basel I, banks' should have same amount of Tier 1 and Tier 2 capital (Balin 2008.)

Risk weights on Basel I are 0 %, 20 %, 50 % and 100 %. 0 % is the risk-free option, 20 % is the credit risk between banks, 50 % is the risk of the mortgages and 100 % is the risk of corporate loans. Banks are obligated to keep at least 8 % of risk-weighted assets or 4 % of Tier 1 assets (Balin 2008.)

Basel I is criticized a lot. Basel I is said to be too narrow to ensure financial stability on international financial system and that it only covers credit risk. The implementation of Basel I is also criticized since bank authorities did not publish and implement it well. Basel I is not designed well enough since banks can go around the standards of the risk weights and thus take substantial risks (Balin 2008.)

2.5.2. Basel II

In the year 1999 Basel committee decides to develop Basel II regulations. Basel II enlarges its scale significantly from the first Basel. It does not focus on only credit risk. Basel II introduces the demand of minimum capital. In the first Basel banks had an opportunity to increase their risks via their subsidiaries. Basel II offers three different ways to analyze risk from banks' assets. First standardized rule is that banks should use market values instead of book values while calculating the risk weights. New risk weights are from AAA to AAA- 0 %, from A to A- 20 %, from BBB+ to BBB- 50 % and from BB+ to BB- 100 %. If evaluation goes below B- its risk weight is 150 %. Non-evaluated debt is weighted as 100 % (Balin 2008.)

The purpose of Basel II is to encourage banks to develop their own inner risk management together with regulators. Since banks must hold 6 % of risk weighted assets, Basel committee offers opportunity to hold less reserves and gain larger profit, if banks agree on inner risk management. Banks with large and complicated activities may define their own credit repayment models. Both models, risk management and own repayment models, help bankers and regulators in many ways. Regulations

encourage banks to accept customers from different risk ratings. Customers with lower risk rate get lower risk weight. Lower risk weight lead to less reserves giving banks a change to higher profits (Balin 2008.)

Basel II intervene on banks operative risk. According to regulations banks should hold 15 % from three-year average on gross income. Banks must also hold certain cash reserve so the bank can protect itself from operational risks. The amount of cash reserve depends on the kind of activities bank has. If bank is, for example a commercial bank, it must hold 15 % of cash reserves. Last risk covered by Basel II is the market risk. Market risk is weighted based on the maturities of loans. Risk arises as the maturity of loan arises (Balin 2008.)

Basel II regulations are more extensive than Basel I. Despite of this Basel II has also received criticism. The problem of Basel II is that it cannot be applied worldwide and that all banks do not need to follow it. Basel II is designed to be exercised in Europe but for example in United States it is exercised in only few of the largest banks. Basel II has also been criticized because the benefits of the regulations are not equally spread (Suomen Pankki 2003.)

Basel bank supervisory committee has noticed weaknesses in Basel II. Basel committee published new strategy to improve Basel II on year 2008. Improvement is needed because of the financial crisis. After financial crisis started Basel committee noticed that all of the systematic risks were not noticed in Basel I and Basel II. Regulations have been based on the safety of single institutions. New targets of Basel committee are for example raising the amount of capital in banking system, raising the quality of banks own assets and building a larger capital buffers (Jokivuolle and Vauhkonen 2010.)

2.5.3. Basel III

Financial crisis that started in the year 2007, is the reason for developing the third Basel accord. Basel III observes regulations from many different countries so there would be negotiation about new common way of governance, future of the banking activities and risk management. Basel III focuses on the quality and quantity of capital and enlargement of capital regulations on a certain types of risks. The purpose of Basel III is to introduce worldwide liquidity standards and set the capital levels that can decrease systematic risk in the worldwide financial markets. In Basel III banks equity

levels have been raised. The core capital has been raised from 2 % to 4,5 % and the demand of Tier 1 capital has been raised from 4 % to 6 %. In new regulations banks should keep their gearing ratio on 7 % and thus capital ratio should be 10,5 % (Went 2010.)

Basel III has also been criticized. According to Nindell-Wignall and Atkinson (2010) Basel III has not a clear model that banks should exercise. Also regulations and tax arbitrage have not been perceived. Banks still have a chance to grow their debt by converting debts to credits and sell them forward to other banks. These credit risks are not included in the risk weights of Basel III because they are not risks to bank anymore. These sorts of credits are out of reach of the regulators and are almost impossible to control (Nindell-Wignall and Atkinson 2010.)

2.6. Risks in banking

Most of the banks profits consist by taking and controlling risk. Banks risks are banking activities risks that include clients and other risks. Other risks involve for example risks in derivatives. Banks risks may also come from inside the banking activities and resources. These sorts of risks are documentation, malpractice, continuous and damage risks. Banks image affects on banks' risk since customers might think that bank is a way riskier than it actually is. Customers' false image of bank might increase common distrust towards the banks. This might cause major damage to bank even though banks' actions were not risky at all. Risks and occasional credit losses are a part of banking activities and those cannot be removed without decreasing activities significantly. The knowledge in banks is the key for risk management (Elomaa 1996:34.)

According to Elomaa (1996) interest rate risk and refinance risks are the most essential risks of banks. Banks financial margin profit forms from subtraction of the profits of interest rates and the cost of interest rates. Profits from interest rates come from issued loans and costs of interest rates come from debts. Since interest rates are tied in margins and interest bases and the maturities of interest rates are different, banks are open to interest rate risks. When risk occurs changes in interest rates and interest bases affect on banks financial margin profit since the planned profits are not in line with the real profits. The more there is a risk in interest rates the more vulnerable banks' financial margin profit is to interest rate changes. Banks interest rates are also

affecting their market values and the sales margin of stocks. The market value of bank forms from subtraction of the net present value of debts and receivables. Since net present value is calculated by discounting, changes in discount rates are affecting banks market value.

(1) $$Ko = \frac{Kn}{(1+i)^n}, where$$

Kn= capital growth in n period
Ko= initial capital
1+i= interest factor of a period

Refinance risk occurs in banks basic duty, maturity transformation. Refinance risk occurs when receivables mature slower than their financing banks need to renew their financing. Renewing the funding includes unawareness and thus it affects on banks' risk. New funding might be expensive because of the changes in markets or banks (Elomaa 1996:54-44.)

Casu, Girardone and Molyneux have divided banks risks in nine different categories. These are credit risk, interest rate risk, liquidity risk, currency risk, market risk, country specific risk, operational risk, outside of accounting risk and other risks. Basel committee has defined credit risk by the default of credits issued by banks. Banks face credit risks from bonds and other deposits also. If bank owns a large share of certain state or company, bank might suffer huge credit losses. When companies go bankrupt it is possible for banks to not get any of their credits back. Banks can follow states and companies credit risks from Standard & Poor's or Moody's. These companies evaluate credit risks. Credits that banks issue to households, is not rated. Banks need to evaluate household risks with their own credit criteria (Casu 2006: 260-261.)

The interest rate risk of banks forms from the subtraction of todays' interest rate level and futures interest rate level. If banks have debt that has low interest rate today and the interest rate rises in future there will be losses on banking activities. If interest rate rises on a credit, which bank has issued, there will be profits. Raise on interest rate risk increases the volatility of bank (Casu 2006: 261-262.) Volatility means swings on profits (Nikkinen, Rothovius and Sahlström 2008:28.)

In liquidity risk, banks asset are not liquid enough. Banks do not have enough reserves that it can transform to cash if it is necessary. Banks suffer from liquidity risk daily

when they receive deposits and issue them forward for loans. Banks must hold suitable amount of liquid reserves because the depositors may unintentionally think that bank is not performing well. In this case, depositors may want to withdraw their deposits. Banks do not hold the amount of all deposits in their reserves, which may cause a huge risk. One misunderstanding may lead to mistrust since banks are not able to accord all the deposits. Crisis in one bank may lead to crisis in other banks. This is called a bank run. Because of one misunderstanding, banks' activities may be supervised (Casu 2006 264-265; Pohjola 2010: 103.)

The currency risk occurs because banks hold their assets in other currencies. Currency risk can be compensated with derivatives. Market risk is caused by the change on short-term asset values. Assets can be stocks, derivatives or bonds. Market risk can be divided in two parts. In systematic market risk all assets have changed their values. In unsystematic market risk only one or few market instrument have changed their values. Country risk occurs when regulations and changes in countries affect on banking activities. Country risk is not really significant since credits, that are issued to countries, are less risky than credits issued to households or corporations (Casu 2006: 266.271.)

In operational risk the whole banking activity is under a risk. Operational risk can be risk in the banking system, risk in the technology or risks in management. Operational risk can arise from inside or outside of the bank. Even natural disasters may affect on operational risk. The risks outside of accounting are explained by contracts of guarantees and non-traditional banking activities. Other risks in banking are inflation risk, risks in bank-to-bank markets, risk from changes in regulation and competition risk (Casu 2006: 272-274.)

3. THE AFFECT OF BANKS CAPITAL STRUCTURE ON BANKS PERFORMANCE

Performance is an important indicator when observing companies or banking activities. Performance can be measured with different indicators depending on how one defines performance. Many studies on performance use profitability calculations.

3.1. Measuring the banks capital structure

Banks' capital structure can be measured by several different ratios. By calculating the ratios, investors get reliable information about banks' current financial stability. Banks are usually more leveraged than other corporations, since most of the banks profits come from the difference between funds lent and borrowed (Casu 2006: 204 Choudhry 2012: 159). The most popular capital structure measures are leverage ratio, relative indebtedness ratio and deposit ratio.

(2) $$leverage\ ratio = \frac{equity}{liabilities}$$

Leverage ratio is satisfying, when it is between 20 % and 40 %. Less than 20 % of the ratio implies poor capital structure as more than 40 % implies good capital structure of the company (Kinnunen, Laitinen, Laitinen, Leppiniemi & Puttonen 2010: 63.)

(3) $$relative\ indebtedness = \frac{liabilities}{revenue}$$

The value of relative indebtedness is satisfactory when it is between 40 % and 80 %. More than 100 % of relative indebtedness implies poor capital structure and is a sign of unreliable company. Relative indebtedness is a ratio that can be interpreted differently in different industries. In banking industry the amount of debt is higher than in other industries. The reason for this is the characteristics of banking (Kinnunen 2010: 63.)

(4) $$deposit\ ratio = \frac{total\ amount\ of\ banks\prime\ loans}{total\ amount\ of\ banks'\ deposits}$$

3.2. Measuring banks performance

Bank performance is measured by different profitability calculations. The most common ones are ROE (return on equity), ROA (return on assets), NIM (net interest marginal) and C/I (costs-profits) ratio. Performance calculations provide information for parties that are interested on bank activities. Parties that are interested on banking activities are: shareholders, loan providers, credit rating agencies, regulators, financial markets and other agencies that operate in financial markets. ROA is used for measuring how much net profit generates assets. The acceptable value of ROA is around 1 % (Casu 2006: 212-215).

(5) $$ROA = net\ income/total\ assets$$

The most important indicator of banks profitability and growth potential is ROE. ROE measures shareholder profits on invested equity. ROE can be calculated as pre cents. The good value of ROE is over 10 %. Great performing banks usually have set the goal for ROE to over 15 %. In this study ROE is denoted as ROAE.

(6) $$ROE = net\ income/total\ equity$$

NIM measures banks interest profits in monetary units per assets. High value of NIM indicates that there is an inequality between the deposit interests and debt. NIM has been decreased in several banking markets, which implicates increased competition in deposit and debt markets. The price that bank pays for deposits is close to the price that banks pay for their loans (Casu 2006: 214).

(7) $$NIM = [(interest\ income - interest\ expences)/total\ assets]$$

C/I is a quick estimator of efficiency. C/I measures the ratio of banks' other costs and banks' all incomes (Casu 2006: 214).

(8) $$C/I = non\ interest\ expenses/(net\ interest\ income + non\ interest\ income)$$

3.3. Different types of banking crisis

Bank runs are a result of a mass hysteria. A large number of depositors, fearing that their bank is about to fail and thus they try to withdraw all of their savings within a short time. The bank run is caused by public, which suspect that banks' go insolvent. When a bank run appears, banks basically run out of cash, since they do not hold all of their deposits in cash. Banks lend out most of the deposits and during the bank run they are forced to sell their assets to meet depositors demands. Bank might not have enough reserves to sell. This might cause, that banks need to sell their loans at loss and this might cause bank insolvency and bank failure (Casu 2006: 162.)

Financial crisis may also be caused by other factors. Risk of a moral hazard is one of them. In moral hazard, banks are relying that government or other institution will rescue their activities in case of insolvency. Many banks are rescued, but some end up insolvent or merge with other banks. Other reasons for banking crisis' can be divided in microeconomic reasons, macroeconomic reasons and system-related reasons (Casu 2006:446.)

Microeconomic reasons for banking crisis come from inside of the bank. Poor banking practices, principal-agent problems, overstaffing and restrictive labor practices are a problem in some banks. Poor banking practices, such as risks in credits can be caused by poor corporate governance practices. Principal-agent problems are usually caused by loan officer compensations. Overstaffing and restrictive labor practices are usually problems in state owned banks (Casu 2006: 446.)

Macroeconomic reasons for banking crises' come from outside of the banks and more than one bank is usually suffering from the crisis. One example of the macroeconomic crisis is 1970's oil crisis. System-related crisis are caused because of the changes in economical environment. These crisis are more common in developing countries. System-related crisis are cause by large state-ownerships, governments directions on banking activities, under-developed legal framework and under-developed stock markets (Casu 2006: 446.)

3.4. Banks performance before, during, and after the financial crisis 2008-2009

Capital structure affects corporations' market value. Corporations are usually evaluated based on their leverage ratio. Highly leveraged corporations seem more risky than less leveraged corporations and thus these corporations are not expected to perform as good as less leveraged corporations. There are restrictions on the capital ratio of the banks. Banks tend to seek optimal leverage ratio that takes account the restrictions. Large amount of lending cause credit risks for bank. If credit risks are realized, banks' might end up insolvent. Credit risks rises when economy is on crisis. During the financial crisis on 2008 banks all over the world had difficulties. Some banks survived the crisis period all though others went out of business or end up merging with other banks (Demirguc-Kunt & Huizinga 2000).

Demirguc-Kunt and Huizinga (2000) research the capital structures impact on banks performance. Their hypothesis is that banks with different capital structures perform differently in financial markets. The study suggests that performance can affect economic growth. In the research the measures of performance are profitability and interest margins. Bank profitability is measured by dividing the profits by the total assets and interest margins are measured by dividing interest profits by the total assets. Banks profitability and interest margins are related to the performance, since these measures separate banks' interest profits and interest costs. These variables impact on the costs of bank lending and via these impacts on investments of corporations. Investments affect the whole economy. The study suggests that banks' capital ratio does not have any impact on banks profits and marginal (Demirguc-Kunt & Huizinga 2000.)

Beltratti and Stulz (2012) study researches how banks', which performed better during the financial crisis on 2008 differ from the banks', which did not perform well during the crisis. The study investigates the banks before the financial crisis. Performance is measured as shareholder profits. The findings of the study suggest that the banks, which are less leveraged on year 2006 performed better during the financial crisis. Large banks that have total assets of over 50 billion dollars on year 2006, with larger amount of Tier 1 capital, deposits and which were less vulnerable to U.S. real estate market and less unstable finances, performed better during the crisis period (Beltratti & Stulz 2012.)

Beltratti and Stulz (2012) also suggest that the banks with shareholder friendly boards performed poorly during the financial crisis. The reason for this is, that these banks maximize the profits of the shareholders and thus they created more wealth before the crisis. The sub-prime loans might have an impact on this result, since the risks of the sub-prime loans were underestimated. In addition to amount of leverage and shareholder friendly boards the study research the impact of country restrictions in large banks. The study proposes that large banks in the countries with strict regulations performed better during the crisis period. Researchers note that strict regulation does not decrease the risks of banks. The cause of better performance is that banks in the more regulated countries practice more traditional ways of banking than the others, so the banks are not as vulnerable to crisis as new banking practices. Banks that have higher amount of equity are less risky. The countries with deposit insurance have higher risks in banking before the financial crisis than the ones without the deposit insurance (Beltratti 2012.)

Berger and Bouwman (2009) study research banks' capital structure before the crisis periods. The capital is compared to banks' survival chances, competitive positions, profitability and share profits around the financial crisis. The study divides crisis periods on bank crisis and market crisis. Banking crisis comes inside the bank and market crisis comes outside of the bank. Study proposes, that small banks with higher amount of assets get through the bank crisis and market crisis. Medium and large sized banks benefit from higher amount of assets only during the bank crisis (Berger & Bouwman 2009.)

Before the study of capital structure Berger and Bouwman (2008) studied the impact of financial crisis and liquidity creation of banks. They research the total amount of liquidity creation before financial crisis, during the financial crisis and after the crisis. Their study covers five major financial crisis in United States. The results show, that before all of the major crisis periods there has been significant changes in abnormal liquidity creations. Before the crisis there might be either too large or too small liquidity creation. Banks that increase their liquidity creation during the financial crisis periods usually get through the crisis better than the banks that decrease their liquidity creation (Berger & Bouwman 2008.)

Vazquez and Federico (2015) analyze the development of bank capital funding structures and their impact on financial stability during 2001-2009. The study shows that banks with less structural liquidity and higher leverage before the crisis period are

more likely to fail after the crisis. In addition to the capital structure, the possibility of bank failure increases with risk-taking before the crisis. The smaller domestic banks are more exposed to liquidity risk although large global banks are more exposed to solvency risk as a result of enormous leverage. Researchers support the Basel III regulations, but they suggest paying attention on the latter (Vazques & Federico 2015.)

Peni and Vähämaa (2011) study, whether good corporate governance impact on banks' performance during the financial crisis. According to the study, banks with stronger corporate governance methods are significantly more profitable on 2008. In addition strong corporate governance methods have negative impact on banks' stock market values during the financial crisis. Banks with better corporate governance have lower Tobins' Q values and stock returns during the crisis. Empirical studies show that good corporate governance does not create value for the banks' shareholders during the unstable markets (Peni & Vähänmaa 2011: 20-21.) Tobins' Q measures the relationship between company's total market value and total asset value (Korhonen & Vanhala 2007: 6.) The study of Peni & Vähämaa shows that banks with better corporate produce better earnings right after the financial crisis on year 2009 (Peni & Vähämaa 2011: 20-21).

Aebi, Sabato and Schimd (2013) research the effect between risk management, good corporate governance and bank performance during the financial crisis. According to the study, the communication between risk managers and board positively impacts on performance of the banks. Banks where risk manager only communicate with the CEO perform significantly worse than other banks. The study shows that different interests between risk manager and CEO cause agency problems and CEO will not take advices from the risk manager. In this case, the risks of the bank will not become to knowledge of the company (Aebi, Sabato & Schimd 2012: 3213-3226). Unlike other studies, Beltratti and Stulz (2012: 1-17) and Fahlenbranch, Prilmeier and Stulz (2011: 11-26) have shown in theirs studies that good corporate governance and bank performance has no impact on each other.

Fahlenbrach, Prilmeier and Stulz (2011) study, how getting through the financial crisis on 1998 impacts on performance during the financial crisis on 2008. In year 1998 United States faced an enormous crisis, since Russia neglected its' debt to United States. This caused investors and bankers to avoid risk. The study assumes that banks' negative experiences make them change their operations. However, banks' usually do not change their business models despite of the experiences of the crisis periods.

Former crisis' in banks are a great predictors of what the next crisis will bring with it (Fahlenbranch 2011.)

Banks' profitability on 1998 explains the profitability during the financial crisis in 2008. According to the study of Fahlenbrach et.al (2011), banks that did not perform during the crisis on 1998 do not perform during the crisis of 2008. Poor performance during the 1998 crisis predicts poor performance on the crisis of 2007-2008 and this causes the raise in insolvency risk in these banks. Poor profits on year 1998 are linked to 4,8 % increased risk to insolvency during the crisis on 2007-2008 (Fahlenbranch 2011).

Banks' capital structure and performance can be measured by several different ways. The most known ones are leverage ratio, relative indebtedness, ROA and ROE. The measures help investors and regulators to evaluate banking activities. Banking industry is not a risk free and it has many possibilities of default. Along with financial crisis, banks might face banking crisis. For example bank run is the type of crisis, which can only occur in banking industry.

Banks performance is studied with different points of view. Some researchers study the impact of capital and performance. There are many alternative results on this. Some studies propose that leverage affects performance: when the amount of leverage is high, the performance is poor. Some studies suggest, that capital structure does not affect profits. Also size effect and the level of corporate governance seem to have some impact on company performance as well as the performance in previous crisis.

4. METHODOLOGIES AND DATA

This study uses yearly data from 2005 to 2014 to capture the impact of financial crisis in banking industry. Data is collected from Bankscope. The Bankscope database is used in numerous studies that discuss banking. For example Gropp and Heider (2010), Shehdaz and De Haan (2013) and Texeira, Silva, Fernandes and Alves (2014) use Bankscope in their researches about financial crisis and banks' leverage. Fitch and other large rating agencies also use Bankscope as a database (Pasiouras, Gaganis and Zopunidis 2006). The data covers periods from before the financial crisis to after the financial crisis. Since the data is about Nordic banks, there are many small commercial banks in the dataset. The data used in this study excludes the smallest ones. It is more reliable to compare banks with similar amount of total assets and including small banks might affect the results of this study. The definition of a small bank is based on the total amount of assets in 2014. The study of Texeira et al (2014) uses banks with total assets of 1 billion USD. Same amount of total assets is used in this study as well. After omitting the smallest banks the data covers 189 Nordic banks. Data covers 45 banks from Denmark, 23 from Finland, 68 from Norway and 53 from Sweden. The main research in this study is done with panel regression.

4.1. Data

This study includes two different types of data from Bankscope. The capital ratio data includes Tier 1 ratio, total capital ratio (TCR), equity to total assets ratio (E/TA), equity to net loans ratio (E/NL), equity to liabilities ratio (E/L), cap funds to net loans ratio (CF/NL), capital funds to total asset ratio (C/T) and capital funds to liabilities ratio (CF/L). These ratios are used to measure banks' capital ratio. Efficiency and profitability data includes: ROAE, recurring earning power (REP), net interest margin (NIM), net interest revenue to average assets (NIRA) and cost to income ratio (CTRI). All of the ratios are measured in all banks that the data covers. The ratios are used to define capital structure and performance in this study.

4.2. Methodologies

This study uses panel regression model for analyzing the research problem. Panel regression model is used, because it allows to research dynamic relationships between variables. Using panel data also helps with controlling unobserved cross section

heterogeneity (Woolridge 2000: 191). Panel regression is used in numerous studies on capital structure and banking, For example Cheng et al (2012) and Texeira et al (2014) use panel regression to estimate their data over time. Empirical analysis in this study starts with summary statistics of the whole data and each Nordic country separately. Secondly the simple correlation, covariance analysis is done. The main research is done with panel regression analysis.

The main study examines the relation between capital structure variables and performance variables. The regression analysis is done similarly to the study of Demiguc-Kunt and Huizinga (2000). They use basic regression equation. This study uses regression formula to research whether capital structure affects performance or not.

(9) $$yit = \propto + \beta' Xit + uit$$

where i = 1….N and T= 1….T, X is dependent variable that represents capital structure variable, Y represents performance variable, U is the error variable and alpha and beta are constants. After main regressions this study runs Huber's M method for the robustness check to ensure that the results are reliable and includes the outliers of the data. Following tables use abbreviations of variables. Table 3 shows the definitions of variables

Table 3. Definitions of variables.
Variables from CF/L to Tier 1 present capital structure and the variables from NIM to CTRI present performance variables.

Variable	Definition
CF/L	Capital funds to liabilities ratio
C/T	Capital funds to total asset ratio
CF/NL	Capital funds to net loans ratio
E/L	Equity to liabilities ratio
E/NL	Equity to net loans ratio
E/TA	Equity to total assets ratio
TCR	Total capital ratio
Tier 1	Tier 1 ratio,
NIM	Net interest margin
NIRA	Net interest revenue to average assets
REP	Recurring earning power
ROAE	Return on equity
CTRI	Cost to income ratio

4.3. Capital structure and performance over time

This section examines the evolution of capital structure and performance during the study period. First this study views summaries from all countries together and then focuses on each country separately. Nordic countries vary from each other by their economic structure. By separating countries at this point, the differences in evolution of variables can be discovered.

Table 4 summarizes the values of all variables used in this study. The table shows that values of variables vary significantly. Maximum values and minimum values have a large difference. Since most of the mean values are closer to minimum values it is obvious that the larger values are exceptional. The table contains all countries and all values from the banks, which are included in this study. Since there are some differences between banks and countries it is quite typical that the values vary from each other. The time period of this study includes financial crisis, which also explains the variety of values in each variable. Kurtosis and skewness of the data shows that the data is not symmetrically distributed. The large values of kurtosis' indicates that the distribution of the data is peaked and variables have more similar than dissimilar values. It can be explained by the banking industry of these countries, since Nordic countries have a highly integrated banking system.

Table 4. Summary statistics of all countries.
Variables from Tier 1 to C/T present capital structure and the variables from ROAE to CTRI present performance variables.

	Tier 1	TCR	E/TA	E/NL	E/L	CF/L	CF/NL	C/T	ROAE	REP	NIM	NIRA	CTRI
Mean	13,5	25,6	7,5	13,4	8,6	11	17,1	9,6	7,9	1,1	1,9	1,7	55,7
Median	12,8	14,6	6,6	9,3	7,3	9,8	12,5	8,9	8,8	0,9	1,5	1,5	53,6
Max	97,3	97,3	48,5	230,3	94,1	94,1	259,9	48,5	150,8	19,4	18,3	9,8	471,8
Min	5,1	6,6	0,4	0,6	0,4	1,1	1,5	1,1	-166,3	-2,1	-0,0	-0,0	0,5
Std. Dev	6,5	7,0	4,4	17,8	6,3	7,1	21,5	4,9	14,3	1,1	1,5	1,3	34,5
Skewness	4,8	4,9	2,6	7,1	5,1	3,9	7,1	1,8	-3,2	5,9	3,2	2,2	6,4
Kurtosis	46,6	41,6	18,0	68,1	54,3	35,9	68,2	11,2	53,8	85,9	25,3	10,6	72,7
Obs.	824	824	824	824	824	824	824	824	824	824	824	824	824

table 3 defines all abbreviations used in this table

Banks as well as companies capital structure and performance variables vary over time. Financial crisis of 2007-2009 left remarkable mark in various number of companies. Next four tables examine how much financial crisis affected banks from different countries. Tables show the mean values of chosen bank variables in different years. It is expected that the values of some variables drop during the financial crisis.

Table 5 shows yearly variables of all banks included in this study. As expected, all values of variables drop when the crisis period started. One exception is cost to income ratio (CTRI), which value dropped right after the crisis on 2009 and 2010. Values of Tier 1 capital and total capital ratio (TCR) rebound shortly after the crisis started and the values raise yearly from 2008. TCR and Tier 1 values pass their 2005 values on year 2009.

Table 5. Yearly variables of all banks.
Variables from Tier 1 to C/T present capital structure and the variables from ROAE to CTRI present performance variables.

Year	Tier 1	TCR	E/TA	E/NL	E/L	CF/L	CF/NL	C/T	ROAE	REP	NIM	NIRA	CTRI
2005	13,14	14,38	12,29	28,78	13,02	14,00	33,06	13,71	14,98	2,20	2,55	2,29	52,61
2006	13,16	14,81	12,01	22,40	18,66	15,36	25,68	11,95	13,46	1,92	2,36	2,08	52,37
2007	10,90	12,57	11,75	19,59	15,42	12,91	22,02	10,49	11,25	1,51	2,18	1,85	55,75
2008	12,02	13,73	11,12	20,43	15,09	11,34	20,51	9,52	2,82	0,79	2,20	1,82	66,55
2009	15,08	16,87	10,83	20,86	13,85	12,25	15,95	11,18	4,62	1,65	2,09	1,82	54,43
2010	15,97	18,03	11,32	30,28	14,60	12,18	18,15	10,12	6,94	1,53	1,97	1,69	53,42
2011	16,88	18,28	11,51	29,36	16,52	10,91	27,19	9,51	6,64	1,18	2,07	1,76	59,90
2012	16,74	18,28	10,98	28,75	20,98	10,74	23,38	9,48	7,45	1,24	2,25	1,91	55,78
2013	18,31	19,91	11,42	27,84	16,96	11,44	23,95	10,05	10,88	1,46	2,29	2,03	50,74
2014	20,16	21,66	11,49	30,97	16,54	11,39	24,65	10,03	12,00	1,47	2,39	2,12	48,05

table 3 defines all abbreviations used in this table

Most of the variables have not rebounded on their before the crisis values in year 2014. The table shows that all of the performance variables still suffer from the financial crisis on 2014. The most significant drops can be seen in cost to income ratio (CTRI), recurring earning power (REP) and ROAE values. The largest drop in performance value is 33 % of the 2005 value in ROAE.

Four of the capital structure variables have passed their 2005 values. Tier 1 capital, total capital ratio (TCR), equity to net liabilities (E/NL) and equity to liabilities (E/L) values have improved from 2005 values. The improvement is between 7 % and 34 %. On the other hand, values of equity to total assets (E/TA), capital funds to liabilities

(CF/L), capital fund to net loans (CF/NL) and capital funds to total assets (C/T) ratios have not recovered from the financial crisis. The decrease of these variables is between 6 % and 27 %. Financial crisis has a negative impact on capital structure and performance variables, but some of the capital structure variables have improved after the crisis period and others still remain lower. Crisis impact on all performance variables and none of them has recovered to same level as they were before the crisis.

Tables 6 to 9 this study focuses on each country separately to research if there is any differences between them. Table 6 examines data from banks in Denmark. 45 of the banks in this study are from Denmark. The start of the crisis in 2007 has not affected all of the variables immediately. As in previous table 4, the value of cost to income ratio has even raised during the financial crisis. The values of cost to income ratio (CTRI) have not been affected by the crisis and it grows higher than the value on 2005 during the crisis period. Cost to income ratio (CTRI) remains higher than on before crisis period though the whole study period.

Table 6. Yearly variables Danish banks.
Variables from Tier 1 to C/T present capital structure and the variables from ROAE to CTRI present performance variables.

Year	Tier 1	TCR	E/TA	E/NL	E/L	CF/L	CF/NL	C/T	ROAE	REP	NIM	NIRA	CTRI
2005	13,50	14,54	13,21	17,69	12,48	14,12	19,31	15,36	12,31	1,42	2,08	1,96	46,62
2006	13,02	14,28	13,55	18,96	31,07	17,44	23,13	13,53	13,66	1,62	2,17	2,04	47,93
2007	11,76	13,42	12,08	15,24	23,82	14,20	19,15	11,92	10,31	1,06	2,06	1,93	54,21
2008	13,58	15,67	11,09	13,62	16,81	11,88	16,13	10,33	-0,35	0,10	2,14	2,00	75,16
2009	15,12	17,35	11,62	17,26	17,41	15,24	20,87	12,51	-6,86	1,47	2,36	2,19	55,09
2010	16,38	18,80	11,95	34,73	17,20	17,13	28,87	13,26	0,85	1,38	2,26	2,08	56,33
2011	19,64	21,68	12,91	33,42	24,27	13,62	28,04	11,74	-1,94	0,61	2,29	2,07	78,74
2012	17,12	18,50	11,33	24,51	19,93	13,44	30,78	11,63	-0,23	1,25	2,42	2,16	57,31
2013	17,76	18,48	12,49	30,11	29,66	13,08	28,68	11,37	-0,30	1,29	2,48	2,21	57,66
2014	18,05	18,79	13,08	33,47	28,85	12,70	31,44	11,08	4,65	1,17	2,55	2,27	56,94

table 3 defines all abbreviations used in this table

Banks in Denmark seem to recover fast from the financial crisis. Only few variables are below the level of 2005 in year 2009. ROAE, capital funds to total assets (C/T) and equity to total assets values are the only ones that have not reached the 2005 level on year 2009. Unlike the mean of all countries, only two of the performance variables do not reach the 2005 values in 2014. The largest drop is in ROAE, which value on 2014 is 62 % less than in 2005. Recurring earning power (REP) has dropped 17 % of its 2005 value. Other performance values have increased from 2005. The largest increase

is in cost to income ratio (CTRI), is 18 %. The mean of all countries showed that cost to income ratio dropped from year 2005 and has not reached the level in 2014.

Three of the capital structure values have not reached the 2005 level in 2014. Equity to total assets (E/TA), capital funds to liabilities (CF/L) and capital funds to total assets (C/T). This result is similar to means of all countries. Although, capital funds to net loans (CF/NL) is significantly higher in Denmark than in all countries together. The raise of the variable is 38 % during the study period. Since Denmark has only 45 banks out of 189 in this study, the results can vary significantly from the mean of all countries.

Table 7 represents the yearly variables of Finnish banks during the study period. Finland has the smallest amount of banks in the data. The minimum amount of total assets is 1 billion in this study and Finland has only 23 banks that reach that value. Only three variables dropped at the beginning of the crisis period. Values of equity to net liabilities (E/NL), capital funds to net loans (CF/NL) and cost to income ratio (CTRI). The largest drop on 2007 is 30 % in capital funds to net liabilities ratio (CF/NL). Most of the variables have even improved from 2005 in year 2007, which implicates that the crisis did not hit Finland as fast as it did to other Nordic countries. In year 2008 almost all of capital structure values sunk below the before crisis values. On the other hand, only ROAE value dropped on 2008, while all the other performance variables grew from 2007.

Table 7. Yearly variables Finnish banks.
Variables from Tier 1 to C/T present capital structure and the variables from ROAE to CTRI present performance variables.

Year	Tier 1	TCR	E/TA	E/NL	E/L	CF/L	CF/NL	C/T	ROAE	REP	NIM	NIRA	CTRI
2005	12,10	14,12	8,46	27,59	9,43	11,43	21,46	10,21	13,52	1,11	1,30	1,21	58,05
2006	12,05	15,06	9,05	20,48	10,76	12,99	18,18	10,80	10,90	1,35	1,34	1,23	50,76
2007	12,13	15,28	10,02	19,97	12,62	12,62	16,26	10,47	17,36	1,69	1,86	1,77	46,72
2008	10,68	13,32	7,99	12,36	9,81	12,63	13,93	10,30	7,01	2,03	1,95	1,83	52,67
2009	11,95	14,62	8,38	13,76	10,16	12,88	14,65	10,60	9,97	2,42	1,74	1,65	53,16
2010	12,55	14,69	8,45	16,72	10,31	12,60	13,35	10,22	8,58	2,13	1,18	1,12	49,50
2011	13,23	14,87	8,04	12,83	9,76	12,05	12,58	9,79	7,43	1,69	1,03	1,00	53,62
2012	14,38	16,61	6,86	12,47	7,71	9,28	13,44	8,18	8,31	0,83	1,06	1,01	56,03
2013	21,12	22,70	7,65	15,72	8,60	10,29	16,37	9,10	8,23	0,84	1,06	1,01	57,25
2014	24,71	25,52	7,21	18,20	8,00	10,02	14,95	8,93	8,37	0,87	1,08	1,03	49,50

table 3 defines all abbreviations used in this table

The table shows that despite the slow reaction to the crisis, all of the performance values are below the 2005 value on 2014. Unlike table 4, Finland has only 2 variables, which values have increased after 2005. Tier 1 capital and total capital ratio (TCR) are the only ones that have recovered after the crisis period. Reason for this might be the strict regulation of the capital structures of banks. Since Basel committee and the European Central Bank have tighten the regulation of capital structure there might be a reason for these variables to grow. Tier 1 capital and total capital ratio (TCR) values have rose in all countries in this study, and all of them follow the Basel regulations. Table 7 shows that banks in Finland have not fully recovered from the financial crisis. Since the values have not rebounded back to their before the crisis levels.

Table 8 represents the Norwegian banks. There are 68 banks from Norway in this study, which is the largest amount compared to other countries. Norway is slightly different country from the other Nordic countries, since it is the only one that does not belong to the European Union. Unlike Finland, almost all of the variables of Norwegian banks dropped in year 2007, cost to income ratio (CTRI) is exceptional, since its value grew 9 % on year 2007 compared to year 2005. This explains why the mean of all countries shows that cost to income ratio grew on 2007.

Table 8. Yearly variables Norwegian banks.
Variables from Tier 1 to C/T present capital structure and the variables from ROAE to CTRI present performance variables.

Year	Tier 1	TCR	E/TA	E/NL	E/L	CF/L	CF/NL	C/T	ROAE	REP	NIM	NIRA	CTRI
2005	11,19	13,20	12,80	16,65	12,74	14,97	20,17	15,10	15,81	3,20	2,94	2,76	58,28
2006	14,77	15,59	12,06	15,67	12,40	13,16	14,71	10,45	13,80	2,32	2,23	2,14	58,92
2007	10,35	12,07	12,02	11,71	8,99	8,91	11,88	8,11	11,90	1,61	1,55	1,50	64,01
2008	11,19	12,88	13,47	18,67	17,91	8,99	12,05	8,17	5,52	0,60	1,67	1,60	66,74
2009	15,65	17,40	11,59	23,02	13,03	10,06	13,49	11,54	9,32	1,70	1,52	1,45	51,88
2010	12,96	14,79	11,53	34,16	11,61	9,96	12,75	8,95	10,10	1,61	1,48	1,41	50,67
2011	12,82	14,36	11,47	30,52	11,36	10,01	38,29	8,99	9,27	1,38	1,44	1,37	53,55
2012	13,59	14,63	11,36	35,66	25,98	10,45	26,95	9,37	8,51	1,20	1,64	1,54	54,23
2013	15,31	16,60	12,17	37,67	12,58	12,05	28,67	10,65	12,01	1,71	1,78	1,72	43,15
2014	15,67	17,30	12,48	42,40	13,68	12,06	28,33	10,64	12,16	1,78	1,93	1,88	40,01

table 3 defines all abbreviations used in this table

In year 2008 and 2009 three of the capital structure variables start to recover from their crisis values. Tier 1 capital, total capital ratio (TCR) and equity to net liabilities (E/NL) values are even higher in 2009 than in 2005. On the year 2014, only three of the capital structure variables remain lower than the before crisis period. Equity to total assets (E/TA), capital funds to liabilities (CF/L) and capital fund to total assets

(C/T) do not rebound back to before crisis level. The drop of these variables is between 2 % to 29 %. The highest improvement in capital structure variables is in equity to net liabilities (E/NL), that is up to 61 %.

All of the performance variables have decreased from before crisis values. Cost to income ratio (CTRI), which increased when the crisis period started on 2007 has the lowest decrease of all performance variables. Cost to income ratio (CTRI) decreased 7 %, as other performance variables decreased between 44 % and 62 % of their 2005 values. Even thought the values of variables have not reached before crisis values, table 7 shows that the banks in Norway are recovering. Only cost to income ratio (CTRI) value is less on 2014 than on 2009, when the financial crisis period officially ended.

Table 9 focuses on Swedish banks. There are 53 banks from Sweden that are included in this study. In year 2007 most of the variables dropped significantly. There are three exceptions on this. Equity to liabilities (E/L), capital funds to liabilities (CF/L) and capital fund to total assets (C/T) have increased from their 2005 values. These values are affected by financial crisis on year 2009 while Tier 1 capital and total capital ratio (TCR) values rebound pass their 2005 values. All of the capital structure variables are affected by financial crisis on year 2007-2009, but not all are affected at the same year. The largest drop of all capital structure variables is in capital fund to net loans (CF/NL), which lost 82 % of its value on year 2009 compared to year 2005. Other variables are affected by the crisis, but the drop in them is less aggressive than in CF/NL.

Table 9. Yearly variables Swedish banks.
Variables from Tier 1 to C/T present capital structure and the variables from ROAE to CTRI present performance variables.

Year	Tier 1	TCR	E/TA	E/NL	E/L	CF/L	CF/NL	C/T	ROAE	REP	NIM	NIRA	CTRI
2005	14,80	15,42	11,87	55,72	15,09	13,43	70,21	10,70	17,74	2,42	3,11	2,58	51,51
2006	11,87	14,42	11,32	34,17	15,05	16,45	43,64	12,35	13,75	2,00	3,05	2,37	49,99
2007	9,68	10,76	11,82	34,27	16,29	17,39	43,50	12,32	8,59	1,76	3,29	2,31	50,09
2008	12,23	12,98	9,13	33,91	11,76	14,07	49,63	10,28	-0,08	1,23	3,24	1,97	65,22
2009	15,54	16,03	9,73	24,74	12,68	10,34	12,48	8,45	7,82	1,39	2,93	2,12	58,93
2010	23,44	25,54	11,54	25,00	18,41	8,17	13,59	7,28	7,63	1,30	2,80	2,01	56,72
2011	23,09	23,38	11,56	30,18	19,12	7,97	14,79	7,12	11,17	1,25	3,26	2,34	53,29
2012	24,44	26,57	11,79	29,29	20,11	8,94	14,70	7,92	12,70	1,46	3,48	2,54	57,22
2013	22,47	25,16	11,05	17,05	15,63	9,15	14,52	8,03	20,34	1,53	3,40	2,62	53,73
2014	26,65	28,50	10,29	17,01	12,86	9,56	15,87	8,42	19,86	1,51	3,44	2,55	52,02

table 3 defines all abbreviations used in this table

Only two of capital structure variables are recovered from the financial crisis. Tier 1 capital and total capital ratio (TCR) have both passed their before the crisis level. Both of the variables have rise over 40 % compared to before the crisis level. Restrictions on capital structure levels of banks might explain this reaction, since other capital structure variables remain below the 2005 values.

Performance variables of Swedish banks decreased when the financial crisis started. Net interest margin (NIM) increased in year 2007, but the value of it dropped on year 2009. Cost to income ratio (CTRI) suffered from only one drop on year 2007 and after that the value of variable begun to rise. On year 2014 three of the performance variables passed their 2005 values. ROAE and net interest margin (NIM) have both improved nearly 10 % from 2005. Cost to income ratio (CTRI) improved less than NIM and ROAE, only 1 % from its 2005 value. Over all Swedish banks seem to recovered quite well from the crisis compared to Finnish and Norwegian banks.

Tables 4 – 9 examine yearly data from all the Nordic countries together and separately. The capital structure and performance variables seem to react similarly on financial crisis. Finland did not react to financial crisis as fast as the other countries, but Finnish banks suffered from financial crisis as much as the other Nordic banks.

Table 10 examines correlation and t-statistics of the whole data. Table shows that all of the capital structure variables highly correlate with each other on 1 % significance level. Unlike capital structure variables, all of the performance variables do not correlate with each other. Table shows that recurring earning power (REP) is the only variable, which correlates with all of the other performance variables with 1 % significance level.

Net interest revenue to average assets (NIRA) and net interest margin (NIM) have almost no correlation with ROAE, the correlation with these variables is less than 4 %. On the other hand, NIM and NIRA highly correlate with each other. The correlation with these variables is 97 %, which means that the variables move to same direction almost all of the times. Cost to income ratio (CTRI) has less correlation with NIRA and NIM than other variables, the variables correlate 8 % to 9 %, with significance levels of 10 % and 5 %. Cost to income ratio (CTRI) has high negative correlation with ROAE and recurring earning power (REP). The negative correlation between

these variables is in between 24 % and 40 %. These variables are likely to move a bit opposite directions at different periods.

The reason for the difference in correlations between capital structure variables and performance variables might be caused because all of the capital structure variables measure capital structure. Performance variables do measure performance, but each variable measures it from different angle. Performance variables measure earning power and income ratios as well as net interests in assets. It is not surprise that the performance variables might not correlate highly with each other, since the variables measure slightly different things.

Table 10 shows that some of the capital structure variables do not correlate with performance variables. Total capital ratio (TCR) has almost no correlation with performance variables, the highest correlation is 6 % with net interest margin (NIM). Tier 1 variable has the highest correlation with net interest margin (NIM) with 11 % and net interest revenue to average assets (NIRA) with 9,6 %. Correlation with net interest margin (NIM) is statistically significant on 5 % level and correlation with net interest revenue to average assets (NIRA) is statistical significant on 10 % level.

Equity to net liabilities (E/NL) correlates significantly with all the other performance variables, except ROAE, which correlates with only -4 %. Other variables correlate in between 15 % to 20 % with 1 % significance level. Equity to liabilities (E/L) correlates with all performance variables. ROAE correlates less than other performance variables -11 % with 10 % significance level. All the other performance variables correlate more with E/L and the results are statistically significant on 1 % level. Capital funds to net loans (CF/NL) correlates with all of the performance variables between 7 % and 18,59 %. The highest correlation is with net interest margin (NIM) and the lowest is with ROAE. ROAE is the only performance variable, which correlation is significant on 5 % level. Correlation with other performance variables is statistically significant on 1 % level.

Equity to total assets (E/TA) correlates with all of the performance variables. The correlation with cost to income ratio (CTRI) is the lowest one with 8,3 % with statistical significance level of 10 %. Other variables correlate with equity to total assets in between 9 % to 47 % with significance level of 1 %. Capital funds to total assets (C/T) correlates with all of performance variables with 1 % significance level. The correlation is in between 16 % and 46 %. ROAE correlates less with capital funds

to total assets with 16 %. Capital funds to liabilities (CF/L) correlates with all of the performance variables with significance level of 1 %. The correlation between variables is in between 19 % and 40 %.

Tables 4 – 10 examine the capital structure and performance variables of the whole data as well as the countries independently. The variables seem to have a small difference in each country. All of the countries in this study have been affected during and after the financial crisis, but the reaction times differ from country to country. Some of the countries still suffer from the crisis but it is noticeable that some of the capital structure variables have improved in all of them. There is a correlation between capital structure variables and performance variables. Table 10 covers the whole data and time periods with simple correlations. The next section will focus on the hypothesis's of the study and research more on banks capital structure impact on bank performance.

Table 10. Correlation of variables

Variables CF/L, CF/NL, C/T, E/NL, E/L, E/TA, TCR and Tier 1 represent capital structure. Variables CTRI, NIM, NIRA, ROAE and REP represent performance.

Corr t-Statistic	CF/L	CF/NL	C/T	CTRI	E/NL	E/L	E/TA	NIM	NIRA	TCR	ROAE	Tier 1	REP
CF/L	1,000												
CF/NL	0,411*** 12,949	1,000											
C/T	0,980*** 142,533	0,434*** 13,830	1,000										
CTRI	0,146*** 4,245	0,183*** 5,347	0,164*** 4,782	1,000									
E/NL	0,412*** 12,971	0,988*** 186,811	0,428*** 13,615	0,153*** 4,452	1,000								
E/TA	0,939*** 78,586	0,387*** 12,069	0,901*** 59,623	0,083* 2,406	0,434*** 13,820	1,000							
E/L	0,917*** 66,243	0,413*** 13,010	0,917*** 66,296	0,088* 2,548	0,461*** 14,929	0,978*** 137,291	1,000						
NIM	0,377*** 11,703	0,185*** 5,427	0,438*** 13,977	0,098** 2,846	0,200*** 5,856	0,378*** 11,740	0,447*** 14,354	1,000					
NIRA	0,404*** 12,664	0,165*** 4,819	0,468*** 15,205	0,082* 2,369	0,181*** 5,280	0,404*** 12,684	0,477*** 15,592	0,976*** 131,045	1,000				
TCR	0,373*** 11,559	0,135*** 3,918	0,298*** 8,967	-0,033 -0,096	0,160*** 4,668	0,429*** 13,654	0,360*** 11,094	0,060 1,733	0,045 1,300	1,000			
ROAE	-0,195*** -5,718	-0,079* -2,287	-0,189*** -5,533	-0,403*** -12,640	-0,043 -1,245	-0,111** 3,216	-0,094** -2,732	0,010 0,297	0,021 0,627	-0,031 -0,903	1,000		
Tier 1	0,428*** 13,602	0,153*** 4,442	0,354*** 10,852	-0,037 -1,076	0,198*** 5,792	0,520*** 17,492	0,460*** 14,870	0,112** 3,250	0,096* 2,768	0,945*** 83,163	-0,024 -0,069	1,000	
REP	0,333*** 10,142	0,162*** 4,731	0,382*** 11,865	-0,248*** -7,367	0,185*** 5,416	0,352*** 10,809	0,414*** 13,042	0,578*** 20,335	0,619*** 22,615	0,034 0,982	0,437*** 13,953	0,068 1,966	1,000 ....

* denotes 10 % significance level, ** denotes 5 % significance level, *** denotes 1 % significance level

table 3 defines all abbreviations used in this table

4.4. Regression analysis

This part of the study is the main part. It examines all of the hypothesis's. T research is done with panel regression analysis. Table 10 will examine H1: capital structure before the financial crisis of 2007-2008 impacts or performance during the crisis period. Capital structure is measured on yea 2006 and performance is measured on years 2007-2008. The hypothesis i similarly to Demiguc-Kunt and Huizinga (2000) research.

(10) $$yi_{2007-2008} = \propto + \beta' Xi_{2005-2006} + uit$$

where i = 1….N and X is independent variable that represents capital s variable, y is dependent variable that represents performance, U is the error and alpha and beta are constants.

Table 11 shows that the coefficient is significant with only ROAE and cost to ratio (CTRI). Cost to income ratio (CTRI) is significant on 10 % level and F significant on 1 % level. Net interest margin (NIM), net interest revenue to assets (NIRA) and recurring earning power (REP) are not impacted by the coe Capital funds to liabilities (CF/L) has significant impact on net interest margir net interest revenue on average assets (NIRA) and cost to income ratio (CTI impact on net interest margin (NIM) and net interest revenue on averag (NIRA) is significant on 10 % level. The impact on cost to income ratio (C significant on 5 % level. Capital funds to liabilities (CF/L) does not have sig impact on recurring earning power (REP) and ROAE during the crisis period.

Capital funds to total assets (C/T) impacts on net interest margin (NIM), RO cost to income ratio (CTRI). The impact on net interest margin (NIM) and F significant on 10 % level and the impact on cost to income ratio (CTRI) is sig on 5 % level. Net interest revenue on average assets (NIRA) and recurring power (REP) are not impacted by capital funds to total assets (C/T).

Capital funds to net loans (CF/NL) has an impact on only recurring earnin (REP). The impact is significant on 10 % level. Other performance variables impacted by capital funds to net loans (CF/NL). Equity to liabilities (E/L) impact on four of the performance variables. This variable has the highest in net interest margin (NIM) on 1 % significance level. Net interest revenue on

assets (NIRA) and cost to income ratio (CTRI) are impacted by equity to liabilities (E/L) on 5 % significance level. Equity to liabilities (E/L) has lowest significant impact on ROAE on 10 % significance level. Recurring earning power (REP) is not significantly impacted by equity to liabilities (E/L).

Equity to net liabilities (E/NL) impacts only on recurring earning power (REP). The impact is significant on 10 % significance level. Equity to total assets (E/TA) has highest impact on net interest margin (NIM). The impact is significant on 1 % level. Equity to total assets (E/TA) has also an impact on net interest revenue on average assets (NIRA), ROAE and cost to income ratio (CTRI). The impact on these variables is significant on 5 % level.

Total capital ratio (TCR) has not impact on any of the performance variables. Tier 1 has an impact on only net interest margin (NIM) and net interest revenue on average assets (NIRA). The impact on net interest margin (NIM) is significant on 1 % level and the impact on net interest revenue on average assets (NIRA) is significant on 5 % level.

The level of capital structure before the crisis has highest significant impact on net interest margin (NIM) and cost to income ratio (CTRI). Capital structure variables have least impacted recurring earning power (REP). Net interest revenue on average assets (NIRA) and ROAE are impacted by the capital structure in most of the cases. Total capital ratio (TCR) has no significant impact on any of the performance variables. Table 11 shows that bank's capital structure before the crisis affect bank performance during the crisis period 2007-2008 in most of the cases. H1 is accepted.

Table 12 examines H2. H2 states that banks' capital structure during the financial crisis of 2007-2008 impacts on banks performance after the crisis period. Tables 4 – 9 show that the capital structure variables have decreased in value during the time period of financial crisis. This hypothesis researches the low periods effect on performance after the crisis period.

(11) $$yi_{2009-2014} = \propto + \beta' Xi_{2007-2008} + uit$$

where i = 1….N and X is independent variable that represents capital structure variable, *Y* is dependent variable that represents performance variable, U is the error variable and alpha and beta are constants.

Table 11. Banks' capital structure before the financial crisis and performance during financial crisis 2007-2008. Capital structures' impact on performance.

Variab.	NIM	NIRA	REP	ROAE	CTRI
C	-0,69	-0,36	0,04	12,57***	22,09*
t-stat	-1,56	-1,16	0,16	3,6	1,87
CF/L	1,84*	1,14*	0,08	-11,04	-53,69**
t-stat	2,08	1,86	0,16	-1,59	-2,29
C/T	-1,92*	-1,07	0,19	15,05*	61,21**
t-stat	-1,81	-1,45	0,32	1,81	2,18
CF/NL	-0,04	-0,09	-0,13*	-1,22	3,83
t-stat	-0,34	-1,15	-2,04	-1,36	1,28
E/L	-2,35***	-1,54**	-0,24	11,47*	51,27**
t-stat	-2,72	-2,55	-0,48	1,69	2,24
E/NL	-0,02	0,05	0,15*	1,60	-4,11
t-stat	-0,16	0,52	1,85	1,44	-1,11
E/TA	2,71***	1,73**	0,09	-16,03**	-56,79**
t-stat	2,63	2,41	0,15	-1,97	-2,07
TCR	-0,02	-0,01	-0,03	-0,53	0,15
t-stat	-0,40	-0,34	-0,82	-1,25	-011
Tier1	0,17***	0,09**	0,02	0,24	0,73
t-stat	2,93	2,29	0,60	0,53	0,49
Obs	-0,34	258	258	258	255
Periods	4	4	4	4	4

* denotes 10 % significance level, ** denotes 5 % significance level, *** denotes 1 % significance level. Notice that observations between variables vary. Some of the variables were not established with all of the banks in this study.
table 3 defines all abbreviations used in this table

Table 12 shows that coefficient is not impacted by all of the capital structure variables. Net interest margin (NIM), net interest revenue on average assets (NIRA) and recurring earning (REP) are not impacted by the coefficient. ROAE and cost to income ratio (CTRI) are impacted by coefficient on 1 % significance level. Capital funds to liabilities (CF/L) has an impact on only ROAE on 1 % significance level. Other performance variables are not significantly impacted by capital funds to liabilities (CF/L).

Capital funds to total assets (C/T) has a significant impact on only ROAE. The impact on ROAE is significant on 1 % level. Other performance variables are not significantly impacted by capital funds to total assets (C/T). Capital funds to net loans (CF/NL) has highest impact on ROAE. The impact is negative and significant on 1 % level. Capital funds to net loans (CF/NL) has significant impact also on cost to income ratio (CTRI). The impact is significant on 5 % level. Other performance variables are not significantly impacted by capital funds to net loans (CF/NL).

Equity to liabilities (E/L) has significant impact on all of the performance variables except cost to income ratio (CTRI). Net interest margin (NIM), net interest revenue on average assets (NIRA), recurring earning power (REP) and ROAE are impacted by equity to liabilities (E/L) on 1 % significance level. Equity to net liabilities (E/NL) has a significant impact on ROAE and cost to income ratio (CTRI). The impact on ROAE is significant on 1 % level and the impact on cost to income ratio (CTRI) is significant on 5 % level.

Equity to total assets (E/TA) has significant impact on net interest revenue on average assets (NIRA), recurring earning power (REP) and ROAE. The significance level of these impacts is 1 %. Cost to income ratio (CTRI) and net interest margin (NIM) are not significantly impacted by equity to total assets (E/TA).

Total capital ratio (TCR) has a significant impact on all of the variables except cost to income ratio (CTRI). The highest impact total capital ratio (TCR) has on ROAE on 1 % significance level. Net interest revenue on average assets (NIRA) is impacted on 5 % significance level. Net interest margin (NIM) and recurring earning power (REP) are both impacted on 10 % significance level. Tier 1 has and impact on all of the performance variables except cost to income ratio (CTRI). The impact on net interest margin (NIM), net interest revenue on average assets (NIRA), recurring earning power (REP) and ROAE is significant on 1 % level.

In table 11 total capital ratio (TCR) did not affect performance variables. The results on table 12 show that all of the capital structure variables affect on all of the performance variables. Bank's capital structure during the financial crisis affect bank performance after the financial crisis. H2 is accepted.

Table 12. Banks' capital structure during the financial crisis and performance after the crisis. Capital structures' impact on performance.

Variab.	NIM	NIRA	REP	ROAE	CTRI
C	-0,22	-0,15	-0,13	7,12***	43,86***
t-stat	-1,37	-1,03	-0,69	3,25	8,17
CF/L	0,14	0,14	0,11	6,02***	-8,84
t-stat	1,45	1,55	1,00	-5,85	-1,05
C/T	-0,1	-0,1	-0,12	-7,71***	12
t-stat	-0,86	-0,93	-0,85	-4,75	1,14
CF/NL	0,01	0,00	-0,01	-0,98***	2**
t-stat	0,23	0,04	-0,38	-2,78	2,3
E/L	-0,75***	-0,71***	-0,61***	-12,95***	5,54
t-stat	-4,58	-4,64	-3,2	-5,85	0,49
E/NL	-0,01	-0,01	0,01	1.20***	-2,18**
t-stat	-0,33	-0,23	0,31	12,77	-2,04
E/TA	1,11	1,03***	0,90***	15,95***	-6,72
t-stat	5,39	5,43	3,78	5,78	-0,48
TCR	0,04*	0,04**	0,04*	0,73***	-0,03
t-stat	1,8	1,97	1,84	2,71	-0,05
Tier1	-0,06***	-0,06***	-0,07***	-0,88***	-0,06
t-stat	-2,46	-2,63	-2,7	-2,80	-0,72
Obs	717	717	717	717	708
Periods	8	8	8	8	8

* denotes 10 % significance level, ** denotes 5 % significance level, *** denotes 1 % significance level. Notice that observations between variables vary. Some of the variables were not established with all of the banks in this study.
table 3 defines all abbreviations used in this table

Table 13 examines H3. H3 states that banks' capital structure affect bank performance over time. This is the last hypothesis of this study. Table shows that only ROAE and cost to income ratio (CTRI) are affected significantly by the coefficient. Both are impacted by 1 % significance level. Net interest margin (NIM), net interest revenue on average assets (NIRA) and recurring earning power (REP) are not impacted by the coefficient.

Capital funds to liabilities (CF/L) affects significantly on recurring earning power (REP) and cost to income ratio (CTRI). The impact on recurring earning power (REP) is significant on 5 % level and the impact on cost to income ratio (CTRI) is significant on 1 % level. Both of the variables are affected negatively by the capital structure variable. Other performance variables are not significantly impacted by capital funds to liabilities (CF/L).

Table 13. Banks' capital structure and bank performance over the whole study period. Capital structures' impact on performance.

Variab.	NIM	NIRA	REP	ROAE	CTRI
C	-0,09	-0,03	0,05	12,59***	43,41***
t-stat	-0,57	-0,18	0,28	6,51	9,28
CF/L	-0,09	-0,09	-0,17**	-0,26	-15,35***
t-stat	-1,17	-1,5	-2,42	-0,31	-2,97
C/T	0,16	0,17*	0,22**	-0,36	20***
t-stat	1,58	1,95	2,24	-0,3	3
CF/NL	0,01	0,00	-0,01	-0,88***	1,88**
t-stat	0,38	0,19	-0,37	-2,58	2,33
E/L	-0,25***	-0,21***	-0,03	-0,41	16,09***
t-stat	-2,7	-2,71	-0,36	-0,38	2,97
E/NL	-0,02	-0,01	0,01	1,06**	-2,02**
t-stat	-0,48	-0,4	0,29	2,55	-2,04
E/TA	0,47***	0,41***	0,19	0,86	-20,01***
t-stat	3,66	3,85	1,51	0,58	-2,84
TCR	-0,01	0,00	0,18	0,36	-0,65
t-stat	-0,54	0,02	0,87	1,51	-1,16
Tier1	0,02	-0,00	-0,04*	-0,48*	0,4
t-stat	0,68	-0,18	-1,75	-1,74	0,63
Obs	833	833	833	833	824
Periods	10	10	10	10	10

* denotes 10 % significance level, ** denotes 5 % significance level, *** denotes 1 % significance level. Notice that observations between variables vary. Some of the variables were not established with all of the banks in this study.
table 3 defines all abbreviations used in this table

Capital funds to net loans (CF/NL) has highest impact on ROAE on 1 % significance level. The variable also affect cost to income ratio (CTRI) but on 5 % significance level. Other performance variables are not significantly affected by capital funds to net loans (CF/NL). Equity to liabilities (E/L) has highly significant impact on net interest margin (NIM), net interest revenue on average assets (NIRA) and cost to income ratio (CTRI). The impact on these variables is significant on 1 % level. Equity to liabilities (E/L) has not significant impact on recurring earning power and ROAE.

Equity to net liabilities (E/NL) affects significantly on ROAE and cost to income ratio (CTRI). The impact on these variables is significant on 5 % level. Other performance variables are not significantly affected by equity to net liabilities (E/NL). Equity to total assets (E/TA) has highly significant impact on net interest margin (NIM), net interest revenue on average assets (NIRA) and negative significant impact on cost to income ratio. These impacts are significant on 1 % level. Recurring earning power (REP) and ROAE are not significantly affected by equity tot net liabilities (E/NL).

Total capital ratio (TCR) has no significant impact on any of the performance variables. Tier 1 has negatively significant impact on recurring earning power and ROAE. The impact is significant on 10 % level. Table 13 shows total capital ratio (TCR) has no impact on any of the performance variables. Cost to income ratio (CTRI) is impacted by almost all of the capital structure variables. Other capital structure variables impact on performance variables. Capital funds to liabilities has a negative impact on all of the performance variables. Only two of these impacts are significant. The results shows that H3 can be accepted. The capital structure of banks affect bank performance over time.

4.5. Results from data analysis

This section completes the results of the panel regression analysis. Table 14 represents results of tables 11-13. H1 to H3 represent hypothesis's. The regression analysis shows that all of the hypothesis's are accepted in most of the cases. This table represents the distribution of hypothesis's. Total capital ratio (TCR) impacts most of the performance variables on only hypothesis two, which states that capital structure during the financial crisis impacts on performance after the crisis period. It would be interesting to research why total capital ratio (TCR) has no significance impact on performance variables during the crisis period and over time. Other capital structure

variables impact on at least on of the performance variable in all time periods in this study.

Different capital structure variables impact on different performance variables. All of the variables are impacted at some point on the study period. Equity to liabilities (E/L) and equity to total assets (E/TA) have similar impacts performance variables. These two variables along with Tier 1 variable have highest impact on performance variables in total.

Table 14. Results.

Variab.	NIM	NIRA	REP	ROAE	CTRI
C				H1 H2 H3	H1 H2 H3
CF/L	H1	H1	H3	H2	H1 H3
C/T	H1	H3	H3	H1 H2	H1 H3
CF/NL			H1	H2 H3	H2 H3
E/L	H1 H2 H3	H1 H2 H3	H2	H1 H2	H1 H3
E/NL			H1	H2 H3	H2 H3
E/TA	H1 H3	H1 H2 H3	H2	H1 H2	H1 H3
TCR	H2	H2	H2	H2	
Tier 1	H1 H2	H1 H2	H2 H3	H2 H3	H2 H3

The result of this study is that banks capital structure affect bank performance in all three time periods. Capital structure before the crisis affect performance during the crisis period. Capital structure during the crisis period affect performance after the crisis period and over time, capital structure affects bank performance.

The results are ensured with robustness check. This study uses Hubers M method to check the robustness of the data. Table 15 represents the results of the robustness check. In table 15 all of the capital structure variables affect performance variables. The impact is highly significant in most of the variables. Results of the robustness check are similar to results of the panel regression analysis.

Table 15. Robustness check.

Variab.	NIM	NIRA	REP	ROAE	CTRI
C	-0,23***	-0,19**	-0,26***	9,55***	37,59***
z-stat	-2,85	-2,53	-4,29	10,51	14,75
CF/L	-0,11***	-0,1***	-0,67***	-6,6***	-20,5***
z-stat	-3,01	-3,16	-24,74	-16,37	-7,28
C/T	0,17***	0,18***	0,88***	8,51***	24,8***
z-stat	3,53	3,84	23,46	15,24	6,82
CF/NL	-0,02	-0,02	-0,04***	-0,61***	0,83*
z-stat	-1,22	-1,3	-3,52	-3,82	1,9
E/L	-0,17***	-0,15***	0,47***	6,62***	15,48***
z-stat	-3,69	-3,56	13,73	13,06	5,23
E/NL	0,03	0,02	0,04***	0,72***	-0,75
z-stat	1,46	1,33	3,2	3,66	-1,4
E/TA	0,4***	0,36***	-0,5***	-8,62***	-17,28***
z-stat	6,43	6,23	-10,51	-12,29	-4,5
TCR	0,04***	0,04***	0,00	0,4***	-0,65**
z-stat	3,7	3,63	0,4	3,53	-2,14
Tier1	-0,05***	-0,05***	-0,00	-0,55***	0,31
z-stat	-4,43	-4,3	-0,46	-4,25	0,88
Obs	833	833	833	833	824

* denotes 10 % significance level, ** denotes 5 % significance level, *** denotes 1 % significance level. Notice that observations between variables vary. Some of the variables were not established with all of the banks in this study.
table 3 defines all abbreviations used in this table

All of the capital structure variables impact on at least two of the performance variables. Even the total capital ratio (TCR), which had the least impact on hypothesis

one and three. Robustness check shows that ROAE is the most affected by the capital structure variables. The results remain similar to the panel regression analysis. All of the performance variables the capital structure variables on 1 % significance level. All of the performance variables are not impacted as much in the panel regression as in robust regression, but the results are similar.

Robustness check shows that there are highly negative significant impacts among variables. Panel regression analysis does not show similar results. There are few negative impacts of these variables, but most of the impacts are positive.

Results of the study remain similar after the robustness check. Banks' capital structure before the financial crisis affect bank performance during the financial crisis 2007-2008. Banks' capital structure during the financial crisis affect bank performance after the financial crisis. Banks' capital structure affect bank performance over time. All of the hypothesis's are accepted.

5. CONCLUSIONS

Banks seem to have an optimal capital structure. By optimizing the capital structure, banks ensure, that they maximize their profits. Some studies suggest that the capital structure does not matter and even that corporations should maximize their amount of debt to maximize the profits. On the other hand, the more debt bank has, the more risks it takes, if something unexpected happens. When the crisis occurs banks with low amount of assets suffer and might end up insolvent. Other studies suggest that banks have capital buffers that protect them during the crisis periods.

Crisis periods are the ultimate tests to banks. By researching banks performance during and after the crisis it is possible to examine banks operation on abnormal market environment. Financial crisis are a great stress test for banks. The banks operation during the crisis period shows how does banks capital structure and the regulations on capital structure actually work. Previous research shows that higher amount of capital helps banks to survive the crisis periods. Studies also show that banks usually keep higher amount of capital than they are required to keep.

Banking crisis might not always be a result from financial crisis. Bank runs might cause enormous crisis's in banks. The runs are caused by public, when for some reason, they do not trust banks ability to operate. This leads banks in crisis situation, when withdrawal activities become larger than expected. Banks might also "create" crisis of their own. Poor governance practices and principal-agent problems might lead to in-bank crisis, which can be even worse than crisis's that come outside of the bank.

The crisis period in this study is caused by macroeconomic reasons. The insolvency of Lehman Brothers led many banks and economies to financial crisis. The crisis begun with subprime loans, which were sold to investors. Even though Nordic banks do not use these kind of products they still suffered from the crisis.

Capital structure can be measured in many different ways. Still the outcome of each ratio is similar. Unlike performance measures, all of the capital structure measures measure only capital structure. This study uses eight different capital structure variables. These variables are highly correlated with each other. Maybe the results might be different if there would have been one extra measure for capital structure that does not correlate with other capital structure variables. Although the amount of variables used in this study is high, so the results are reliable.

Performance measures do measure performance, but since performance can be measured from different angles and views the outcomes might differ from each other significantly. Banks performance might seem excellent in one ratio but terrible in other. That is why this study uses five different performance variables. This improves the reliability of the study. All of the performance variables do not correlate with each other, which proofs that the variables measure different angles of performance. This adds the reliability of this study.

Banks performance is measured in different time periods: during the financial crisis, after the financial crisis and during the whole study period. Financial crisis can be seen as an event, which test the banks ability to operate in different environments. It is meaningless to examine banks performance in normal financial market conditions, since the banking activities are practiced for a long time. The data shows that banks performance was effected by the financial crisis and in some cases, the performance has not recovered back to its before crisis level. The results show that financial crisis impacted on banks performance.

On the other hand some of the capital structure variables have improved after the crisis period. Especially tier 1 capital and total capital ratio have recovered fast after the crisis period. The regulations and risen amount of supervision might explain this. The new Basel accord sets higher capital requirements and banks in Nordic countries follow the given regulations. Banks have motivation to rise their capital buffers because of the regulation and recent financial crisis. The crisis of 2007-2008 affected the whole western world and banking industry. Even if banks perform well, the insolvency of other banks might affect their performance. So it is crucial, that banks have strong enough capital buffer to protect them from future crisis's.

It is important to notice that there are also other factors that affect banks performance. Performance in previous financial crisis's predict the performance in the future financial crisis. Some studies show that corporate governance have an impact on performance as well. Bad corporate governance affects negatively on firms performance. One research suggest that shareholder friendly boards perform worse during the financial crisis than banks, which boards are not focusing on only shareholder profits. By maximizing shareholder value, the banks in that particular study take more risks to maximize shareholder value.

Banks co-operate with each others and with central banks. The insolvency of one bank may lead distrust on other banks and affect the whole banking industry. When Lehman Brothers fell, some other banks end up insolvent or merged with other banks in order to survive. Regulations of different countries and large institutions are set to prevent financial crisis's. Banking activities are regulated by laws of the operating countries as well as European Union and Basel committee. National institutions supervise banking activities and give notes, if banks are not following the regulations.

This study includes banks from four different countries: Denmark, Finland, Norway and Sweden. Norway is the only country that does not belong to the European Union. All of the countries in this study have similar laws and regulations on banking activities. Denmark, Finland and Sweden also follow the regulations from European Union. All countries included this study follow regulations of Basel committee. The regulations of Basel committee are designed to function in different banking environments. Since this study examines Nordic countries, the banking activities and regulations are quite similar from country to country.

Nordic countries (Denmark, Finland, Norway and Sweden) have a lot in common especially in banking industry. All of the countries have banks, which operate in every Nordic country. The largest ones Nordea and Danske bank are operating in all Nordic countries and they have a large customer base in each country. So the banking industry in Nordic countries is highly integrated. All countries in this study have few major banks, which cover most of the banking activities. Nordea has a significant coverage in all Nordic countries expect in Norway. There are small bank in each country, but they are struggling to reach as much coverage as the large ones.

This study examines only Nordic banks because most of the similar studies in this particular topic are done with US. or all EU countries. Nordic banking environment is quite different from large economies, so it is interesting to examine does the capital structure affect banks performance. Iceland is left outside of this study, because of its enormous banking crisis on 2008. Most of the largest banks in Iceland went insolvent and the whole financial markets in Iceland collapsed. The results of this study might have been significantly different, if Iceland would be included in this study.

The results show that banks capital structure affect bank performance in the whole time period used in this study. Capital structure impacts on performance during the financial crisis 2007-2008 and after the crisis period. The regression analysis shows

that the results are significant. The results are slightly different in each performance variable, but overall banks capital structure has a huge impact on banks performance.

The results are significant. Although it was expected that the capital structure affect performance it is quite interesting to see that not all performance variables are affected by capital structure. Total capital ratio has least impact on performance variables on hypothesis one and three.

The regulations and supervision of banks seem to be the right way to control banking activities. Since capital structure is affecting banks performance it is extremely important that these regulations on capital are set. Capital requirements prevent banks from insolvency and by this decrease the risks of banks customers. For shareholders, the requirements might not be convenient, since the risks as well as profits shrink when banks cannot operate in highest possible level of leverage.

It is interesting to see that most of the performance and capital structure variables still suffer from financial crisis on 2014. The crisis ended on 2008 and the banks are still suffering from it. It is mentionable, that this particular crisis affected banks and economies in al western countries. The crisis's before this one were more local. The globalization have a huge impact on this.

The data shows that all of the Nordic banks included this study suffered from financial crisis. Recovering from the crisis is slow and it is hard to say, when the damages of the crisis will be recovered. On 2014 most of the banks still suffer from the crisis. The data of 2015 and 2016 was not available when the data of this study was collected, so there might be some changes in past one and a half year. For some reason banks in Finland reacted later on the crisis than other Nordic banks. For further studies, it would be interesting to find out, why Finnish banks did not react to the crisis as fast as the other Nordic banks. Especially because some banks that operate in Finland also operate in other Nordic countries.

The results show that total capital ratio has least impact on performance variables when the ratio is measured before the financial crisis and during the whole study period. It would be interesting to research why other capital structure variables have higher impact on performance variables and why total capital ratio impacts only when it is measured during the financial crisis period. This could be done to improve this study.

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APPENDIX

Appendix 1. Banks

	Name	City	Country	TA
1.	Norges Bank	OSLO	NO	934 219
2.	Nordea Bank AB (publ)	STOCKHOLM	SE	812 604
3	Danske Bank A/S	COPENHAGEN K	DK	564 089
4.	Nordea Bank Finland Plc	NORDEA - HELSINKI	FI	420 296
5.	Svenska Handelsbanken	STOCKHOLM	SE	364 072
6.	DnB ASA	OSLO	NO	356 574
7.	Skandinaviska Enskilda BankenAB	STOCKHOLM	SE	341 396
8.	DNB Bank ASA	OSLO 1	NO	317 899
9.	Swedbank AB	STOCKHOLM	SE	274 190
10.	Nykredit Realkredit A/S	COPENHAGEN V	DK	238 206
11.	Stadshypotek AB	STOCKHOLM	SE	136 863
12.	Realkredit Danmark A/S	COPENHAGEN V	DK	136 334
13.	Arbejdsmarkedets Tillaegspension-ATP	HILLEROED	DK	134 541
14.	OP-Pohjola Group-OP Osuuskunta	HELSINKI	FI	134 062
15.	Nordea Bank Danmark Group-Nordea Bank Danmark A/S	COPENHAGEN C	DK	133 516
16.	Swedbank Hypotek AB-Swedbank Mortgage AB	STOCKHOLM	SE	117 345
17.	Totalkredit A/S	TAASTRUP	DK	110 229
18.	OP-Pohjola Group Central Cooperative	HELSINKI	FI	89 982
19.	Jyske Bank A/S (Group)	SILKEBORG	DK	88 489
20.	Danmarks Nationalbank	COPENHAGEN	DK	87 639
21.	Nordea Bank Norge ASA	OSLO	NO	87 448
22.	Nykredit Group (Combined)		DK	86 906
23.	DNB Boligkreditt AS	BERGEN	NO	86 774
24.	Nordea Kredit Realkreditaktieselskab	COPENHAGEN C	DK	73 827
25.	Storebrand Group-Storebrand ASA	OSLO	NO	66 257
26.	Sveriges Riksbank	STOCKHOLM	SE	64 938
27.	Nordea Hypotek AB (publ)	STOCKHOLM	SE	63 481
28.	Pohjola Bank plc-Pohjola Pankki Oyj	POHJOLA	FI	61 555
29.	Kommunalbanken AS	OSLO	NO	61 301
30.	Suomen Pankki Finlands Bank Bank of Finland	HELSINKI	FI	57 936
31.	Länsförsäkringar AB	STOCKHOLM	SE	46 006

32.	SBAB Bank AB	STOCKHOLM	SE	43 816
33.	BRF Kredit A/S	LYNGBY	DK	42 686
34.	AB Svensk Exportkredit-Swedish Export Credit Corporation	STOCKHOLM	SE	42 030
35.	Kommuninvest i Sverige AB	OREBRO	SE	40 335
36.	Sampo Plc	HELSINKI	FI	38 953
37.	Nykredit Bank A/S	COPENHAGEN	DK	37 554
38.	Municipality Finance Plc Kuntarahoitus Oyj	HELSINKI	FI	36 432
39.	Danske Bank Plc	HELSINKI 7	FI	36 047
40.	KommuneKredit	COPENHAGEN K	DK	32 903
41.	SpareBank 1 Boligkreditt AS	STAVANGER	NO	30 632
42.	Länsförsäkringar Bank AB (Publ)	STOCKHOLM	SE	30 011
43.	Swedish Covered Bond Corporation (The)	STOCKHOLM	SE	29 528
44.	DLR Kredit A/S	COPENHAGEN	DK	25 752
45.	Sydbank A/S	AABENRAA	DK	24 883
46.	SpareBank 1 SR-Bank ASA	STAVANGER	NO	23 543
47.	Sparebanken Vest	BERGEN	NO	19 794
48.	Länsförsäkringar Hypotek AB	STOCKHOLM	SE	19 161
49.	SpareBank 1 SMN	TRONDHEIM	NO	16 965
50.	Nordea Eiendomskreditt AS	OSLO	NO	16 159
51.	SkandiaBanken Aktiebolag	STOCKHOLM	SE	14 878
52.	Fokus Bank ASA	TRONDHEIM	NO	14 542
53.	Aktia Bank Plc	HELSINKI	FI	12 998
54.	Santander Consumer Bank AS	LYSAKER	NO	12 954
55.	Spar Nord Bank	AALBORG	DK	12 877
56.	Sparebanken Sor	KRISTIANSAND S	NO	12 660
57.	OP Mortgage Bank	HELSINKI	FI	11 901
58.	Eksportfinans ASA	OSLO	NO	11 525
59.	Danmarks Skibskreditfond-Danish Ship Finance - DSF	COPENHAGEN K	DK	11 333
60.	Sparebank 1 Nord-Norge	TROMSOE	NO	11 196
61.	Eika Boligkreditt AS	OSLO	NO	10 942
62.	Landshypotek Bank AB	STOCKHOLM	SE	10 613
63.	Landshypotek Ekonomisk Förening	STOCKHOLM	SE	10 612
64.	Kommuninvest Cooperative Society - Kommuninvest Group	OEREBRO	SE	10 286
65.	The Savings Banks Group		FI	10 199
66.	Avanza Bank Holding AB	STOCKHOLM	SE	8 698
67.	Sparebanken Vest Boligkreditt As	BERGEN	NO	8 205
68.	Finnvera Plc	KUOPIO	FI	8 047
69.	Handelsbanken Finans AB	STOCKHOLM	SE	7 596

70.	Sparebanken More	AALESUND	NO	7 578
71.	Helsinki OP Bank Plc	HELSINKI	FI	7 538
72.	Sparebank 1 Gruppen	OSLO	NO	7 415
73.	Sparebanken Hedmark	HAMAR	NO	6 721
74.	Arbejdernes Landsbank A/S	COPENHAGEN V	DK	6 555
75.	Nordnet AB	STOCKHOLM	SE	6 479
76.	Alm. Brand A/S	COPENHAGEN	DK	6 390
77.	Saxo Bank A/S	HELLERUP	DK	5 882
78.	Nordea Finans Sverige AB (Publ) Nordea Finance Sweden plc	STOCKHOLM	SE	5 854
79.	S-Pankki Oy	HELSINKI	FI	5 781
80.	Sparebanken Sogn og Fjordane	FORDE	NO	5 740
81.	Danske Civil- og Akademiingeniorers Pensionskasse DIP	COPENHAGEN K	DK	5 714
82.	Alandsbanken Abp-Bank of Aland Plc	MARIEHAMN	FI	5 211
83.	Sparbanken Oeresund AB	MALMOE	SE	5 199
84.	Obos BBL	OSLO	NO	5 177
85.	Nykredit Holding A/S	COPENHAGEN	DK	4 888
86.	BNbank ASA	TRONDHEIM	NO	4 817
87.	Bank 1 Oslo Akershus AS	OSLO	NO	4 788
88.	Sparebanken Ost	DRAMMEN	NO	4 711
89.	Storebrand Bank ASA	OSLO	NO	4 576
90.	Swedish Export Credits GuaranteeBoard-EKN	STOCKHOLM	SE	4 543
91.	SG Finans AS	OSLO	NO	4 526
92.	Norwegian Banks' Guarantee Fund-Bankenes Sikringsfond	OSLO	NO	4 227
93.	KLP Banken AS	TRONDHEIM	NO	4 005
94.	Gjensidige Bank ASA	FOERDE	NO	3 970
95.	Sandnes Sparebank	SANDNES	NO	3 879
96.	FIH Erhvervsbank A/S-Finance for Danish Industry A/S - FIH Group	COPENHAGEN	DK	3 815
97.	Volvofinans Group-Volvofinans Bank AB	GÖTEBORG	SE	3 787
98.	Vestjysk Bank A/S	LEMVIG	DK	3 562
99.	Finansiel Stabilitet A/S	COPENHAGEN	DK	3 539
100.	Helgeland Sparebank	MOSJOEN	NO	3 472
101.	Ringkjoebing Landbobank	RINGKJOEBING	DK	3 469
102.	Oulun Osuuspankki	OULU	FI	3 447
103.	GE Money Bank AB	STOCKHOLM	SE	3 433
104.	IKANO Banken AB (Publ)	ÄLMHULT	SE	3 385

105.	LR Realkredit A/S	COPENHAGEN	DK	3 327
106.	Sparekassen Sjaelland	HOLBAEK	DK	3 156
107.	SpareBank1 BV	SANDEFJORD	NO	3 076
108.	Sor Boligkreditt AS	KRISTIANSAND	NO	2 765
109.	Sparekassen Kronjylland	RANDERS	DK	2 730
110.	Aktia Hypoteksbank ABP-AktiaReal Estate Mortgage Bank Plc	HELSINGFORS	FI	2 710
111.	BankNordik P/F	TORSHAVN-FAROE ISLANDS	DK	2 701
112.	KLP Kommunekreditt AS	TRONDHEIM	NO	2 695
113.	Fana Sparebank	NESTTUN	NO	2 692
114.	Industrikredit	STOCKHOLM	SE	2 681
115.	Sparebanken Telemark	SKIEN	NO	2 639
116.	Den Jyske Sparekasse	GRINDSTED	DK	2 627
117.	Sparebank Kreditt	OSLO	NO	2 610
118.	Resurs Bank AB	HELSINGBORG	SE	2 585
119.	SpareBank 1 Ringerike Hadeland	HOENEFOSS	NO	2 583
120.	LandKreditt AS	OSLO	NO	2 462
121.	SpareBank 1 Naeringskreditt AS	STAVANGER	NO	2 444
122.	Alandsbanken Asset Management AB	STOCKHOLM	SE	2 443
123.	LandKreditt Bank AS	OSLO	NO	2 428
124.	Sparebank 1 Ostfold Akershus	MOSS	NO	2 421
125.	Bankaktieselskabet Alm. Brand Bank	COPENHAGEN V	DK	2 354
126.	Jutlander Bank A/S	AARS	DK	2 307
127.	SEB Finans AB	BROMMA	SE	2 285
128.	Obosbanken AS	OSLO	NO	2 266
129.	Laan & Spar Bank A/S	COPENHAGEN	DK	2 237
130.	Marginalen Bank Bankaktiebolag	STOCKHOLM	SE	2 220
131.	Bank DnB A/S	COPENHAGEN	DK	2 193
132.	More Boligkreditt AS	ALESUND	NO	2 187
133.	Sparbanken Nord	PITEA	SE	2 171
134.	Swedbank Sjuhärad AB	BORAS	SE	2 103
135.	Sparekassen Vendsyssel	VRAA	DK	2 084
136.	Bolig- og Naeringskreditt AS	TRONDHEIM	NO	2 075
137.	Storebrand Boligkreditt AS	LYSAKER	NO	2 018
138.	Oma Saastopankki	SEINAJOKI	FI	1 965
139.	Totens Sparebank	LENA	NO	1 888
140.	Nordax Group AB	STOCKHOLM	SE	1 834
141.	Suomen Hypoteekkiyhdistys	HELSINKI	FI	1 821
142.	Norwegian Finans Holding ASA	OSLO	NO	1 807
143.	Bank Norwegian AS	OSLO	NO	1 805

144.	Nordax Holding AB	STOCKHOLM	SE	1 789
145.	Nordax Bank AB	STOCKHOLM	SE	1 787
146.	Lounaismaan Osuuspankki	SALO	FI	1 787
147.	Danske Andelskassers Bank A/S	TJELE	DK	1 763
148.	Norfund	OSLO	NO	1 708
149.	Optia Savings Bank-SäästöpankkiOptia	IISALMI	FI	1 664
150.	ICA Banken AB	SOLNA	SE	1 652
151.	Carnegie Investment Bank AB	STOCKHOLM	SE	1 608
152.	Selskabet af 1. september 2008 A/S	ROSKILDE	DK	1 571
153.	Sparebank 1 Nordvest	KRISTIANSUND	NO	1 569
154.	Sörmland Sparbank	KATRINEHOLM	SE	1 534
155.	Pareto Bank ASA	OSLO	NO	1 526
156.	Varbergs Sparbank AB	VARBERG	SE	1 518
157.	Gjensidige Bank Boligkreditt AS	OSLO	NO	1 464
158.	Eika Grupen AS	OSLO	NO	1 453
159.	Nordjyske Bank A/S	FREDERIKSHAVN	DK	1 451
160.	SEB Kort Bank AB	STOCKHOLM	SE	1 436
161.	Sparbanken Alingsas	ALINGSAS	SE	1 422
162.	Bustadkreditt Sogn og FjordaneAS-SSF Bustadkreditt AS	FORDE	NO	1 402
163.	Marginalen AB	STOCKHOLM	SE	1 376
164.	BlueStep Finans AB	STOCKHOLM	SE	1 343
165.	BRFKredit Bank A/S	LYNGBY	DK	1 280
166.	Sparbanken Skaraborg AB	SKARA	SE	1 269
167.	Skue Sparebank	NESBYEN	NO	1 251
168.	Eik Banki P/F	TORSHAVN - FAROE ISLANDS	DK	1 244
169.	Sparebanken Ost Boligkreditt As	DRAMMEN	NO	1 205
170.	SVEA Ekonomi AS	STOCKHOLM	SE	1 182
171.	Haugesund Sparebank	HAUGESUND	NO	1 178
172.	Sparbanken Rekarne AB	ESKILSTUNA	SE	1 154
173.	SpareBank 1 Hallingdal	AL	NO	1 150
174.	Alfred Berg Holding AB	STOCKHOLM	SE	1 134
175.	Sparebank 1 Sore Sunnmore	VOLDA	NO	1 130
176.	Sparebanken 1 Sore Sunmore	VOLDA	NO	1 124
177.	Pareto A/S	OSLO	NO	1 114
178.	Middelfart Sparekasse	MIDDELFART	DK	1 100
179.	Leaseplan Norge AS	OSLO	NO	1 094
180.	OP-Korttiyhtio Oyj	HELSINKI	FI	1 091
181.	Djurslands Bank A/S	GRENAA	DK	1 086
182.	Lægernes Pensionsbank A/S	FREDERIKSBERG	DK	1 062

183.	Sparbanken Syd	YSTAD	SE	1 059
184.	Aurskog Sparebank	AURSKOG	NO	1 054
185.	Liedon Säästöpankki	LIETO	FI	1 032
186.	Falkenbergs Sparbank	FALKENBERG	SE	1 027
187.	Sparekillingsbanken		NO	1 017
188.	Westra Wermlands Sparbank	ARVIKA	SE	1 009
189.	Sparekassen Thy	THISTED	DK	1 000